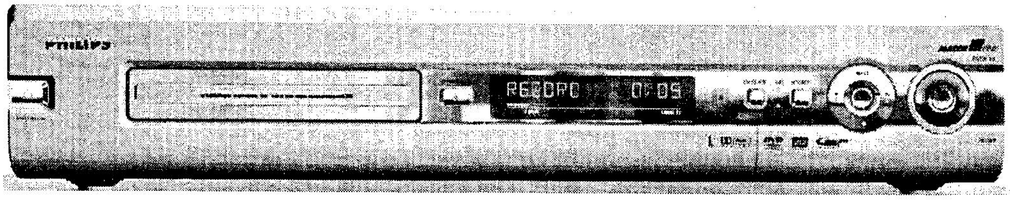
Hard Disc/DVD-Video Recorder HDRW720/0x, DVDR725H/0x

Service
Service
Service



Service Manual

CLASS 1
LASER PRODUCT

DVD+ReWritable

DIGITAL VIDEO

DIGITAL AUDIO

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PHILIPS

1. Technical Specifications and Connection Facilities

1.1 Diversity Matrix

	HDRW720/00	HDRW720/02	HDRW720/05	DVDR725H/00	DVDR725H/02	DVDR725H/05
Front Board						
PBAS DC 04 E1	X	X	X	X	X	X
Analog Board						
PBAS AB HDD E1	X	X		X	X	
PBAS AB HDD E2			X			X
Power Supply Interface						
PBAS PSI SUB	X	X	X	X	X	X
UP Sub PWB						
PBAS UP SUB HDD E1	X	X	X	X	X	X
Digital Board						
PBAS CHRY F EF3_AV3	X	X	X	X	X	X
In / Out Extension Board						
PCB ASSY IOE CST E1	X	X	X	X	X	X
EPG Board						
PBAS EPG MODULE EURO	X	X	X	X	X	X
Basic Engine						
VAD8031/01 (AV3)	X	X	X			
VAD8041/01 (AV3.5)	X	X	X	X	X	X
Power Supply Module						
AC6220 B	X	X	X	X	X	X

1.2 General:

Mains voltage : 198V-276V
Mains frequency : 43 Hz - 63Hz
Power consumption mains : 28 W
Power consumption standby : < 7 W
Power consumption low power stand-by : < 3 W

1.3 RF Tuner

Test equipment:Fluke 54200 TV Signal generator
Test streams:PAL BG Philips Standard test pattern

1.3.1 System:

PAL B/G, PAL D/K, SECAM L/L', PAL I

1.3.2 RF - Loop Through:

Frequency range : 45 MHz - 860 MHz
Gain: (ANT IN - ANT OUT) : -6 dB to 0dB

1.3.3 Radio Interference:

input voltage /3 tone method (+40 dB min) : no limit

1.3.4 Receiver:

PLL tuning with AFC for optimum reception
Frequency range: : 45.25 MHz - 857 MHz
Sensitivity at 40 dB S/N : ≥ 60dBμV at 75Ω (video unweighted)

1.3.5 Video Performance:

Channel 25 / 503,25 MHz,
Test pattern: PAL BG PHILIPS standard test pattern,
RF Level 74 dBV
Measured on SCART 1
Frequency response: : 0 - 4.00 MHz +0-4dB
Group delay (0.1 MHz - 4.4 MHz) : 0 nsec ± 150nsec

1.3.6 Audio Performance:

Audio Performance Analogue - HiFi:
Frequency response at SCART 1 (L+R) output: : 100 Hz - 12 kHz / 0± 3dB
S/N according to DIN 45405, 7, 1967 : and PHILIPS standard test pattern video signal: : FM: ≥ 50dB; AM ≥ 45dB, unweighted
Harmonic distortion (1 kHz, ± 25 kHz deviation): : FM ≤ 1.5%; AM ≤ 2%

Audio Performance NICAM:
Frequency response at SCART 1(L+R) output: : 40 Hz - 15 kHz 0 ± 3dB
S/N according to DIN 45405, 7, 1967 : and PHILIPS standard test pattern video signal: : ≥ 60 dB unweighted
Harmonic distortion (1 kHz): : ≤ 0.5 %

1.3.7 Tuning

Automatic Search Tuning
scanning time without antenna : typ. 3 min. PAL
stop level (vision carrier) : ≥ 37dBμV
Maximum tuning error of a recalled program : ± 62.5 kHz
Maximum tuning error during operation : ± 100 kHz

Tuning Principle
automatic B,G, I, DK and L/L'detection

manual selection in "STORE" mode

1.4 Analogue Inputs

1.4.1 SCART 1 (Connected to TV)

Pin Signals:

1	- Audio R	1.8V RMS	○→
2	- Audio R		→○
3	- Audio L	1.8V RMS	○→
4	- Audio GND		⏚
5	- Blue/Chroma GND		⏚
6	- Audio L		→○
7	- Blue out/ Chroma in	0.7Vpp ± 0.1V into 75 Ohm (*)	□→
8	- Function switch	<2V = TV >4.5V / <7V = asp. ratio 16:9 DVD >9.5V / <12V = asp. ratio 4:3 DVD	○→
9	- Green GND		⏚
10	- P50 control		□→
11	- Green	0.7Vpp ± 0.1V into 75 Ohm (*)	
12	- Nc		
13	- Red/Chroma GND		⏚
14	- fast switch GND		⏚
15	- Red out/ Chroma out	0.7Vpp ± 0.1V into 75 Ohm (*) ± 3dB 0.3Vpp Chroma (burst)	□→
16	- fast switch RGB/ CVBS	or Y <0.4V into 75 Ohm = CVBS >1V / <3V into 75 Ohm = RGB	○→
17	- Y/CVBS GND OUT		⏚
18	- Y/CVBS GND IN		⏚
19	- CVBS/Y	1Vpp ± 0.1V into 75 Ohm (*)	○→
20	- CVBS/Y		→□
21	- Shield		⏚

1.4.2 SCART 2 (Connected to AUX)

Pin Signals:

1	-Audio R	1.8V RMS	○→
2	-Audio R		→○
3	-Audio L	1.8V RMS	○→
4	-Audio GND		⏚
5	-Blue/Chroma GND		⏚
6	-Audio L		→○
7	-Blue in/ Chroma out	± 3dB 0.3Vpp Chroma (burst)	□→
8	-Function switch		→○
9	-Green GND		⏚
10	-P50 control		□→
11	-Green		→□
12	-Nc		
13	-Red/Chroma GND		⏚
14	-fast switch GND		⏚
15	-Red in/ Chroma in		→□
16	-fast switch RGB/ CVBS or Y		→○
17	-CVBS GND OUT		⏚
18	-CVBS GND IN		⏚
19	-CVBS/Y/RGB sync	1Vpp ± 0.1V into 75 Ohm (*)	○→
20	-CVBS/Y		→□
21	-Shield		⏚

(*) for 100% white

1.4.3 Audio/Video Front Input Connectors

Audio		
Input voltage	:	2 Vrms
Input impedance	:	>10kΩ
Video - Cinch		
Input voltage	:	1 Vpp ± 3dB
Input impedance	:	75 Ω
Video - YC (Hosiden)		
Input voltage Y	:	1Vpp ± 3dB
Input impedance Y	:	75 Ω
Input voltage C	:	burst 300 mVpp ± 3 dB
Input impedance C	:	75 Ω

1.5 Video Performance

All outputs loaded with 75 Ohm
SNR measurements over full bandwidth without weighting.

1.5.1 SCART (RGB)

SNR	:	> -65 dB on all output
Bandwidth	:	4.8 MHz ± 2dB

1.6 Audio Performance CD

1.6.1 Cinch Output Rear

Output voltage 2 channel mode	:	2Vrms ± 2dB
Channel unbalance (1kHz)	:	<1dB
Crosstalk 1kHz	:	>95dB
Crosstalk 20Hz-20kHz	:	>85dB
Frequency response 20Hz- 20kHz	:	±0.2dB max
Signal to noise ratio	:	>95 dB
Dynamic range 1kHz	:	>85dB
Dynamic range 20Hz-20kHz	:	>80dB
Distortion and noise 1kHz	:	>85dB
Distortion and noise 20Hz-20kHz	:	>75dB
Intermodulation distortion	:	>77dB
Mute	:	>95dB
Outband attenuation:	:	>40dB above 30kHz

1.6.2 Scart Audio

Output voltage 2 channel mode	:	1.6Vrms ± 2dB
Channel unbalance (1kHz)	:	<1dB
Crosstalk 1kHz	:	>85dB
Crosstalk 20Hz-20kHz	:	>70dB
Frequency response 20Hz- 20kHz	:	± 0.2dB max
Signal to noise ratio	:	>85 dB
Dynamic range 1kHz	:	>75dB
Dynamic range 20Hz-20kHz	:	>70dB
Distortion and noise 1kHz	:	>75dB
Distortion and noise 20Hz-20kHz	:	>65dB
Intermodulation distortion	:	>70dB
Mute (spin-up, pause, access)	:	>85dB
Outband attenuation:	:	>40dB above 25kHz

1.7 Digital Output

1.7.1 Coaxial

CDDA/ LPCM (incl MPEG1)	: according IEC958
MPEG2, AC3 audio	: according IEC1937
DTS	: according IEC1937, amendment 1

1.8 Digital Video Input (IEEE 1394)

1.8.1 Applicable Standards

Implementation according:
IEEE Std 1394-1995
IEC 61883 - Part 1
IEC 61883 - Part 2 SD-DVCR (02-01-1997)
Specification of consumer use digital VCR's using 6.3 mm magnetic tape - dec.1994
Mechanical connection according:
Annex A of 61883-1

1.9 P50 System Control

Via SCART pin nr 10

1.10 Dimensions and Weight

Height of feet	: 10mm
Apparatus tray closed	: WxDxH :435 x 324.5 x 88cm
Apparatus tray open	: WxDxH :435 x 366 x 88cm
Weight without packaging	: app. 4 kg ± 0.5 kg
Weight in packaging	: app. 6.5 kg

1.11 Laser Output Power & Wavelength

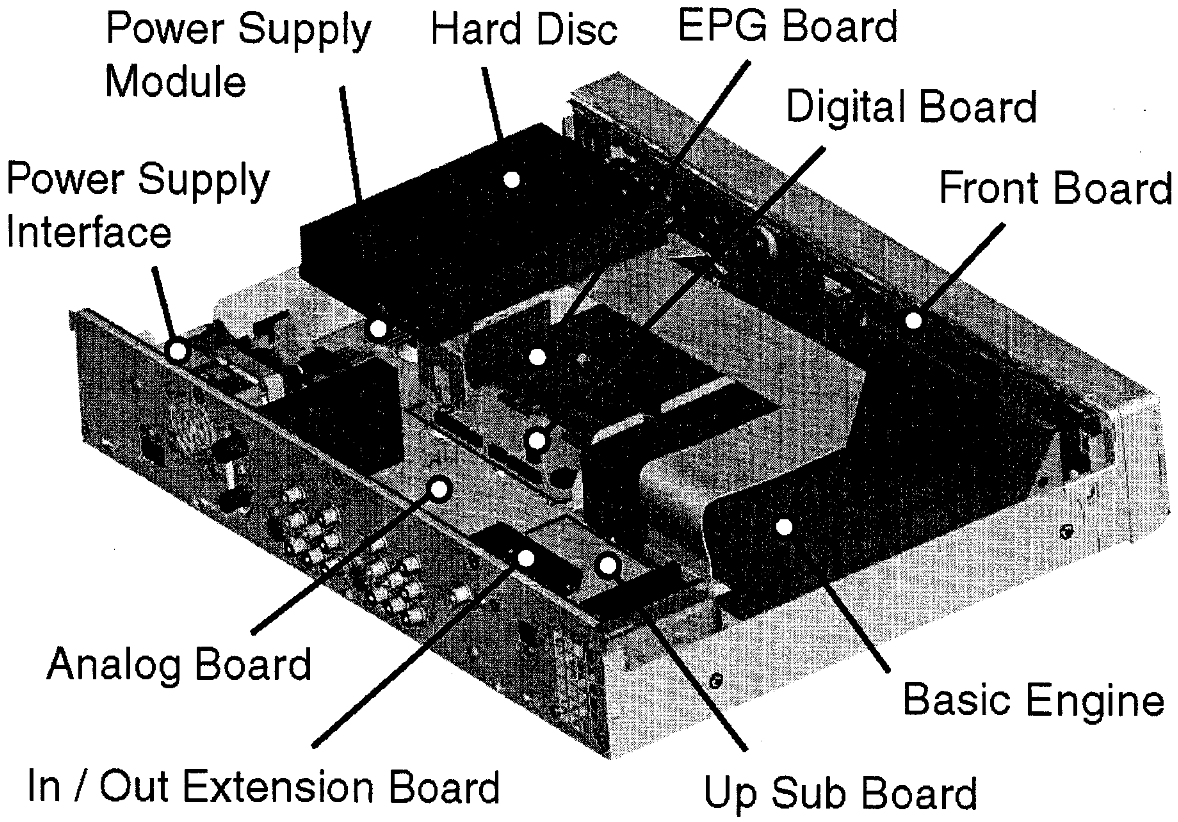
1.11.1 DVD

Output power during reading	: 0.8mW
Output power during writing	: 20mW
Wavelength	: 660nm

1.11.2 CD

Output power	: 0.3mW
Wavelength	: 780nm

1.12 PCB Locations


Power Supply Module
Hard Disc
EPG Board
Digital Board
Front Board
Power Supply Interface
Analog Board
In / Out Extension Board
Up Sub Board
Basic Engine

2. Safety Information, General Notes

2.1 Description of the Production Number on the type plate

The type plate of the set contains a production number that consists of the following:

x	x														Site Code (Production center)
		x													BOM (Bill of Material) code
			x												Service version change code
				x	x	x	x								Production year/week code
								x	x	x	x	x	x		Serial number (6 digits)
V	N	1	A	0	3	4	2	1	2	3	4	5	6		Example code

2.1.1 The Site Code (Production center)

The site code consists of 2 letters and relates to the factory assembling and/or equipping the products. The site code letters valid for Consumer Electronics are stated in UAT-0477. The code is used to trace the production site of the model number,
e.g. VN...Szekesfehervar
KB...Hasselt
KT...SBI Electronics Shenzhen

2.1.2 BOM Code

The BOM code is used to link the model to the actual Bill Of Material used for assembly during set production. One set model can be made up of different standard designs / modules. This depends on the material availability in the production or the development progress of the successor modules. Different modules may be used during the same production period or changed back and forth from one week to the other.
BOM version 1 gets BOM code 1, BOM version 2 gets BOM code 2, etc. Allowed codes are 1-9, A-Z.

2.1.3 Service Version Change Code

The service version change code, which has to be recognizable for service and production departments, is used to indicate a production change that is considered as a major change affecting the "serviceability" of the product. A major change is occurring when a safety component is changed or when the servicer needs additional information to repair the set. E.g. when the software is changed or when an IC and its peripheral circuit are changed. Allowed characters are (A-Z, 0-9) to be used in the following sequence: A-Z followed by 0-9.

2.1.4 Production year/week code

Indicates the actual week of set assembly. Made up of the last two digits of year plus production week.

2.1.5 Serial number

The six digit serial numbers.

2.2 Safety Instructions

2.2.1 General Safety

Safety regulations require that during a repair:

- Connect the unit to the mains via an isolation transformer.
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:

- Route the wires/cables correctly, and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the electrical DC resistance between the mains plug and the secondary side:
  1. Unplug the mains cord, and connect a wire between the two pins of the mains plug.
  2. Set the mains switch to the 'on' position (keep the mains cord unplugged!).
  3. Measure the resistance value between the mains plug and the front panel, controls, and chassis bottom.
  4. Repair or correct unit when the resistance measurement is less than 1 MΩ.
  5. Verify this, before you return the unit to the customer/user (ref. UL-standard no. 1492).
  6. Switch the unit 'off', and remove the wire between the two pins of the mains plug.

2.2.2 Laser Safety

This unit employs a laser. Only qualified service personnel may remove the cover, or attempt to service this device (due to possible eye injury).

Laser Device Unit

Type : Semiconductor laser GaAlAs
Wavelength : 650 nm (DVD)
: 780 nm (VCD/CD)
Output Power : 20 mW (DVD+RW writing)
: 0.8 mW (DVD reading)
: 0.3 mW (VCD/CD reading)
Beam divergence : 60 degree

CLASS 1
LASER PRODUCT

Figure 2-1

Note: Use of controls or adjustments or performance of procedure other than those specified herein, may result in hazardous radiation exposure. Avoid direct exposure to beam.

2.3 Warnings

2.3.1 General

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are at the same potential as the mass of the set by a wristband with resistance. Keep components and tools at this same potential. Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.

- Wristband tester 4822 344 13999.

- Be careful during measurements in the live voltage section. The primary side of the power supply (pos. 1005), including the heatsink, carries live mains voltage when you connect the player to the mains (even when the player is 'off'!). It is possible to touch copper tracks and/or components in this unshielded primary area, when you service the player. Service personnel must take precautions to prevent touching this area or components in this area. A 'lightning stroke' and a stripe-marked printing on the printed wiring board, indicate the primary side of the power supply.
- Never replace modules, or components, while the unit is 'on'.

2.3.2 Laser

- The use of optical instruments with this product, will increase eye hazard.
- Only qualified service personnel may remove the cover or attempt to service this device, due to possible eye injury.
- Repair handling should take place as much as possible with a disc loaded inside the player.
- Text below is placed inside the unit, on the laser cover shield:

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VARNING SYNLIG OCH OSYNLIG LASERSTRÅLNING NÅR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN
VARO! AVATT AESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETSEN
DANGER VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
ATTENTION RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

Figure 2-2

2.3.3 Notes

Dolby

Manufactered under licence from Dolby Laboratories. “Dolby”, “Pro Logic” and the double-D symbol are trademarks of Dolby Laboratories. Confidential Unpublished Works. ©1992-1997 Dolby Laboratories, Inc. All rights reserved.

DOLBY SURROUND
PRO • LOGIC

Figure 2-3

Trusurround

TRUSURROUND, **SRS** and symbol (fig 2-4) are trademarks of SRS Labs, Inc. TRUSURROUND technology is manufactured under licence frm SRS labs, Inc.

Figure 2-4

Video Plus

“Video Plus+” and “PlusCode” are registered trademarks of the Gemstar Development Corporation. The “Video Plus+” system is manufactored under licence from the Gemstar Development Corporation.

VIDEO Plus+®

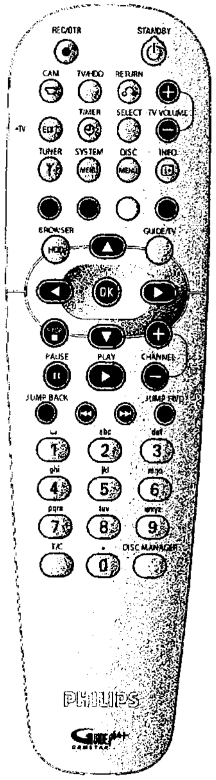
Figure 2-5

Macrovision

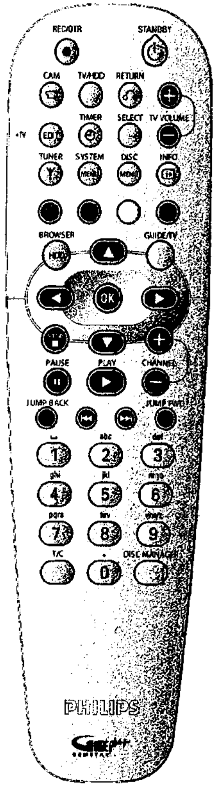
This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners.

Use of this copyright protection technology must be autorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

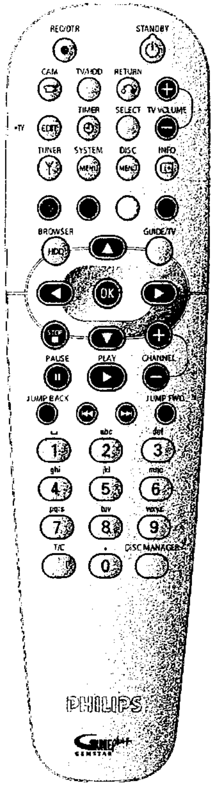
The remote control



REC/OTR ●	Record the current TV channel on the HDD, mark recordings in the time shift buffer to be stored on HDD. Hold button down to separate the beginning of a title (Mark the recording from the beginning of the actual position in the Time Shift Buffer).
STANDBY ⏻	To switch set on or off, interrupt menu function. A programmed recording (TIMER) or an archiving process will be continued until the end, and the device will then be switched off.
CAM	Switch to 'Camera mode' (recording directly on the HDD and not through time shift buffer), switch to input sockets (' **S-VIDEO (CAM1) / VIDEO (CAM1)** ', ' **DV IN (CAM2)** ').
TV/HDD	Switches scart socket **EXT2 AUX-I/O** of the DVD recorder directly to the TV set. This lets you watch the picture from any unit connected to this scart socket (set-top box, video recorder or satellite receiver) and at the same time record from another source. If you have not connected a device to the **EXT2 AUX-I/O** socket or the device is switched off, you can use this button to switch between TV reception and the signal of the DVD recorder. This, however, functions only if you have connected your TV set to the DVD recorder using a scart cable (socket **EXT1 TO TV-I/O**) and your TV set reacts to the switching.
RETURN	Return to previous menu on a video CD (VCD). This also works with some DVD discs. Moreover, you can jump back to the previous scene of the time shift buffer or to playback from the HDD. You can switch to the picture of the actual running TV show with the **TUNER** buttoen.
EDIT	Call up/Cancel the edit menu. Call up/Cancel the menu for editing titles during playback.
TIMER ⏲	To make a TIMER programming with/without ShowView® system or to alter/clear programmed recordings.
SELECT	Select function/value. You can mark several titles in the media browser. Switch on repeat play during playback from a disc.
TUNER	This button lets you switch to the picture of the internal tuner (TV channel). During play back from the Time Shift Buffer, you can jump to the actual TV show (live) of the selected TV channel.
SYSTEM MENU	Call up/Cancel the system menu. Depending on the operating mode from which you press this button: •)DVD system menu: Press **DISC MENU** first. •)HDD system menu: Press **TUNER** first.
DISC MENU	For displaying the DVD menu or the index screen overview.
INFO	For displaying additional information on the screen or the time shift buffer during playback/recording on the HDD (**TUNER / BROWSER HDD** button). Call up additional information in the GUIDE Plus+® system.
RED	Red function button, in some screens the function fo a 'clear' button.
GREEN	Green function button
YELLOW	Yellow function button
BLUE	Blue function button



BROWSER HDD	Call up/cancel the overview of HDD recordings (media browser).
GUIDE/TV	Call up/Cancel the GUIDE Plus+® System
▲ ▼	Cursor buttons up, down in the menus. Previous or next position in the time shift buffer during playback from HDD.
◀ ▶	Cursor buttons left, right in the menus. Previous or next position during playback of a title from the HDD (media browser or time shift buffer). If you hold down this button you can faster brwose trough the recordings. The speed will increase automatically.
OK	Confirming of functions Starting the playback from the beginning in the 'Media Browser'.
STOP ■	Stop playback Hold down the button to open and close the disc tray.
PAUSE II	If this button is pressed during playback, the DVD recorder switches to pause. You will see a still picture. If this button is pressed during recording in the 'Camera mode', the DVD recorder switches to pause and inserts a chapter marker.
PLAY ▶	Play back a recorded disc. In the GUIDE Plus+® system: OK button.
CHANNEL +	Next programme number
CHANNEL −	Previous programme number
JUMP BACK	To jump back a certain time period that can be changed in the settings of the HDD.
⏮	Briefly press the button during playback: Previous chapter or previous title Hold down the button: Search backwards Hold down the button during the still picture: slow motion backwards
⏭	Briefly press the button during playback: Next chapter or next title Hold down the button: Search forwards Hold down the button during the still picture: slow motion forward
JUMP FWD	To jump forward by a certain time period that can be changed in the settings of the HDD.
0..9	For entering numbers or letters at the corresponding entry fields.
T/C	Switching between title and chapter for selection using ⏮ , ⏭ . If 'INFO' appears in the display, the index menu from a recorded disc will be shown or an introductory film will be played. In this case, this function is not available.
DISC MANAGER	Call up/Cancel the disc manager (DM).



Additional TV functions

With the enclosed multicode remote control you can control the main functions of your TV set. To do this, you must first enter a code number that corresponds to the make of your TV set. You will find a summary of all available remote control commands on the last page of this manual. How to enter this code number you will read in the chapter ' Using your DVD-Recorder remote control with your TV set'.

TV VOLUME +	Increase TV volume
TV VOLUME −	Reduce TV volume

For the following functions you need to hold down the • **TV** button (on the left side) and then select the function you need with the appropriate button.

STANDBY ⏻	Switch on/off TV set
0..9	Number buttons 0 - 9
CHANNEL +	To select a higher programme number
CHANNEL −	To select a lower programme number

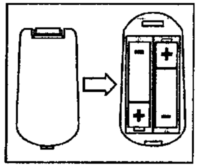
Additional TV functions for Philips TV-sets if supported from the TV. You need to hold down the • **TV** button (on the left side).

T/C	switch Teletext (TXT) on/off
TIMER ⊕	Clock display on the screen on/off
RETURN	To return to the previous selected TV program/ previous menu step
SYSTEM MENU	Call up the System Menu from the TV
▼ , ▲	In the menus cursor up/down
◄ , ►	In the menus cursor left/right
OK	Confirm functions or settings
Colour buttons	Colour buttons for special functions
TUNER	Switching the TV from the external sockets to the internal tuner.

Preparing the remote control for operation

The remote control and its batteries are packed separately in the original DVD recorder packaging. You must install the batteries in the remote control before use - described in the following section.

1. Take the remote control and the enclosed batteries (2 batteries).



2. Open the battery compartment, insert the batteries as shown and then close the battery compartment.

The remote control is now ready to use.
Its range is approximately 5 to 10 meters.

'Aim' correctly
Aim the remote control at the DVD recorder and not at the TV set.

Using your DVD-Recorder remote control with your TV set

With the enclosed multicode remote control you can control the main functions of your TV set. To do this, you must first enter a code number that corresponds to the make of your TV set.
You will find a summary of all available remote control codes on the last page of this manual.

1. Hold down the **STANDBY ⏻** button.
2. Using the number buttons **0..9** , enter the code number that corresponds to the make (manufacturer) of your TV set.
3. When you have entered the code number check that, the TV set will responds to the **TV VOLUME −** or **TV VOLUME +** buttons.

× **My TV set will not react**
✓ Also try to enter the other code numbers or that of other manufacturers.
✓ In some cases, it is possible that your TV set will not react to the selected code numbers. If this is the case, you unfortunately cannot use this function.

× **How can I reset the code?**
✓ Enter the number 000.

If you remove the batteries, the selected code will be stored for about 5 minutes before resetted to 000.

4. By using the **TV** buttons of the control, you can:

TV VOLUME +	increase the TV volume
TV VOLUME −	decrease the TV volume
STANDBY ⏻	switch off the TV set
CHANNEL +	next programme number
CHANNEL −	previous programme number

Additionally on Philips TV-sets:

T/C	switch Teletext (TXT) on/off
TIMER ⊕	Clock display on the screen on/off
RETURN	To return to the previous menu step
SYSTEM MENU	Call up the System Menu from the TV
▼ , ▲	In the menus cursor up/down
◄ , ►	In the menus cursor left/right
OK	Confirm functions or settings
Colour buttons	Colour buttons for special functions
TUNER	Switchng the TV from the external sockets to the internal tuner.

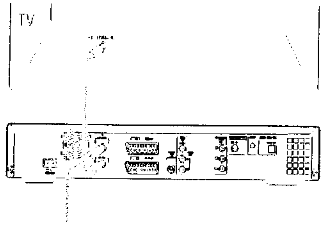
Connecting to the aerial

To receive TV programmes you have to connect the DVD-recorder to the aerial or the cable network.

❶ Switch off your TV set.

❷ Remove the aerial cable plug from your TV set. Insert it into the **ANTENNA IN** socket at the back of the DVD recorder.

❸ Insert one end of the supplied aerial cable into the **TV OUT** socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



Connecting to the TV

Choose from the following connections:

Connection with scart cable

Connection with S-videocable

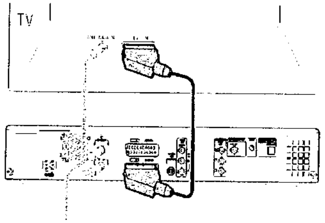
Connection with Video (CVBS) cable

Connection with the aerial cable

Connection with scart cable

The scart or Euro AV cable serves as the universal connector for picture, sound and control signals. With this type of connection, there is practically no loss of quality in picture or sound transmission.

❶ Plug a scart cable into the scart socket **EXT1 TO TV-I/O** at the back of the DVD recorder and the scart socket for the DVD recorder at the back of the TV set (see TV set operating instructions).



Several scart sockets on the TV?

Select the scart socket that is suitable for both video output and for video input.

Selection menu for the scart socket?

On some TV sets select 'VCR' as the source for this scart socket. Read your instruction manual for your TV set for further information.

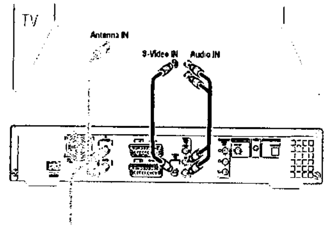
○ Read the next chapter 'Connecting additional devices' on how to connect additional devices (satellite receivers, videorecorders,...) to the input-/output sockets.

Connection with an S-Video(Y/C)cable

This connecting cable, also known as the SVHS cable, is used to transmit the brightness signal (Y signal) and colour signal (C signal) separately. This mini DIN socket/plug is also called a Hosiden socket/plug.

❶ Insert one end of an S-Video(SVHS) cable into the **S-VIDEO OUT (Y/C)** socket at the back of the DVD recorder and the other end into the S-Video (SVHS) input socket on the TV set (usually labelled 'S-Video in' or 'SVHS in'. See TV operating instructions).

❷ Insert one end of an audio (Cinch) cable into the red/white Cinch socket **AUDIO OUT L/R** at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio in' or 'AV in'. See TV operating instructions).



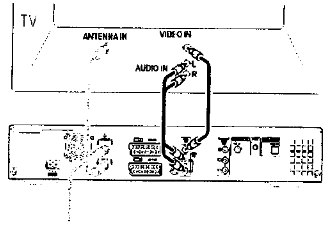
○ Read the next chapter 'Connecting additional devices' on how to connect additional devices (satellite receivers, videorecorders,...) to the input-/output sockets.

Connection with video (CVBS) cable

This cable, usually with yellow Cinch connectors, is used for transmitting the Composite Video signal (FBAS, CVBS). In this method of transmission the colour signal and the brightness signal are transmitted on the same cable. In certain circumstances, this can lead to slight problems with the picture, such as 'Moiré' patterns.

❶ Insert one end of a video (CVBS) cable into the yellow Cinch socket **VIDEO OUT (CVBS)** at the back of the DVD recorder and the other end into the video input socket (usually yellow) on the TV set (usually labelled 'Video in' or 'AV in'. See TV operating instructions).

❷ Insert one end of an audio (Cinch) cable into the red/white Cinch socket **AUDIO OUT L/R** at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio in' or 'AV in'. See TV operating instructions).



○ Read the next chapter 'Connecting additional devices' on how to connect additional devices (satellite receivers, videorecorders,...) to the input-/output sockets.

Connecting with the aerial cable

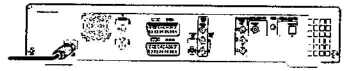
To connect this DVD-Recorder to a TV set without external Audio/Video input sockets, you need a modulator. With the modulator the audio/video signal is converted in an UHF-channel. This signal can be received and stored on the TV as a TV-station.

Connecting to the mains

Always check if the local mains voltage matches the voltage range printet on the type plate at the back or bottom of the DVD-recorder. If not consult your dealer or the customer support from your country.

❶ Switch on the TV set.

❷ Insert one end of the supplied mains cable into the mains socket **∼MAINS** at the back of the DVD recorder and the other end into the wall socket.

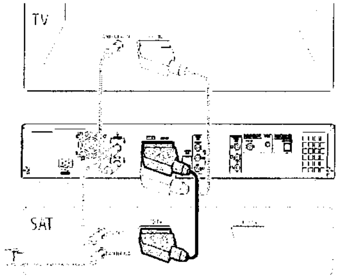


→ The most important features of the DVD recorder will appear in scrolling text on the display.

After the first installation is completed this function will be switched off. How you switch on this function again, read in the chapter 'User preferences' in the section 'standby'.

Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

Connecting additional devices to the second scart socket

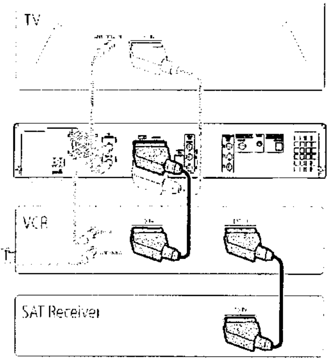


You can connect additional devices such as decoders, satellite receivers, camcorders, etc. to the **EXT2 AUX-I/O** socket.

When playback is started on this additional device the DVD recorder automatically connects the **EXT2 AUX-I/O** scart socket with the **EXT1 TO TV-I/O** scart socket. You will then see the picture from the additional device on your TV set, even if the DVD recorder is switched off.

- The **TV/HDD** button on the remote control allows you to switch between playback through the **EXT2 AUX-I/O** scart socket and playback from the DVD recorder.

Connecting a video recorder, DVD player.



You can also connect a video recorder or a DVD player to the **EXT2 AUX-I/O** input socket.
The DVD recorder must be connected **directly** to the TV set (**EXT1 TO TV-I/O** socket directly to the TV set). If there is a video recorder in between the picture quality may be poor because of the copy protection system built into the DVD recorder.

- If you already have an external receiver (satellite receiver, set-top box, cable TV box) connected to this socket, you can connect the video recorder to the 'VCR', 'TO VCR', ...socket of the external receiver.

- You can also use the front sockets **S-VIDEO (CAM1)**, **VIDEO (CAM1)** and the **L AUDIO R (CAM1)** audio sockets.
For more information read the chapter 'Recording on the HDD'.

Connecting an external receiver

1. Connect the **scart socket** of the receiver (satellite receiver, set-top box, cable TV box,...) provided for the TV set (usually labelled 'TV', 'TO TV',...) with the **EXT2 AUX-I/O** socket of the DVD recorder.

   - If your external receiver offers several options for the signal available at the 'TV', 'TO TV',... socket, choose the 'RGB' setting.

Why can't I use the 'VCR', 'TO VCR',... socket?

In order to achieve the best possible picture quality, you must use the RGB (red-green-blue) signal of the receiver. As a rule, this signal is available at the 'TV', 'TO TV',.., socket. The DVD recorder transfers the signal to the **EXT1 TO TV-I/O** *socket.*

Some receivers only provide a 'Video (CVBS/FBAS)' signal at the 'VCR', 'TO VCR'...socket.
If you are satisfied with the picture quality of the 'VCR', 'TO VCR',... socket, you can also use this socket.
Read the instruction manual of the receiver which signals are available at the sockets.

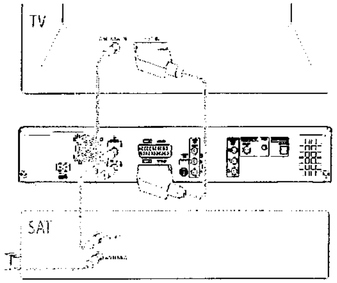
Connecting additional receivers

For additional receivers, you can also use the **EXT1 TO TV-I/O** *socket (if the TV set is connected to the* **COMPONENT VIDEO OUT** *sockets).*

Connecting additional devices only via aerial cable

If you want to connect additional devices (e.g. satellite receiver...) only via aerial cable, please observe the following:

The DVD-Recorder must be connected directly to the TV set. If there is a video recorder or an additional device in between, the picture quality may be poor because of the copy protection system built into the DVD-Recorder.



The additional device (satellite receiver) must be connected **before** the DVD recorder (additional device - DVD recorder - TV set). Only the TV set must be connected to the **TV OUT** socket.

If there is interference in the picture when the additional device is switched on, a TV broadcaster may be transmitting on the same channel or a channel very close to that of the additional device. (e.g.: TV broadcaster on channel 45, additional device (satellite receiver) also on channel 45). In this case, change the channel of the additional device (satellite receiver). Consult the instruction manual of the additional device.
You must also store this channel on the DVD recorder to be able to record TV programmes from the additional device (satellite receiver).

Switch on the additional device during the installation of the DVD recorder. During the automatic channel search, the channel on which the additional device is transmitting will be stored as a TV channel.

Connect camcorder to the front sockets

To copy camcorder recordings, you can use the front sockets. These sockets are located behind the flap on the right hand side. These sockets are located behind the flap on the right hand side.

Digital (DV) input socket

If you have a DV or Digital 8 camcorder, connect the **DV IN (CAM2)** input of the DVD recorder to the appropriate DV output on the camcorder.
Choose '***CAM2***' as a programme number for this input.

When films are transferred to the HDD or a DVD+RW/+R the original recording date and time are stored as DVD subtitles.
On playback, this data can be displayed on the TV screen by using the '▭' function (Subtitle).

S-video input socket

If you have a Hi8 or S-VHS(C) camcorder, connect the **S-VIDEO (CAM1)** input of the DVD recorder to the appropriate S-VHS output on the camcorder.
You must also connect the audio input **L AUDIO R (CAM1)** on the DVD recorder to the audio output on the camcorder.

Choose '***CAM1***' as a programme number for this input.

Video (CVBS) input socket

If you have a camcorder that only has a single video output (Composite Video, CVBS), connect the **VIDEO (CAM1)** input on the DVD recorder to the appropriate output on the camcorder.
You must also connect the audio input **L AUDIO R (CAM1)** on the DVD recorder to the audio output on the camcorder.

Choose '***CAM1***' as a programme number for this input.

Connecting audio devices to the analogue audio sockets

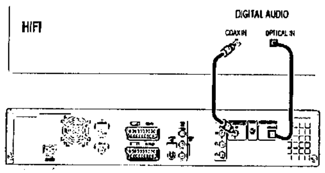
Two analogue audio sockets **AUDIO OUT L/R** (audio signal output left/right) are located at the back of the DVD recorder.

These can be used to connect the following:
•) a receiver with Dolby Surround Pro Logic
•) a receiver with two-channel analogue stereo

Can I use the 'Phono' input on my amplifier?

This socket (input) on the amplifier is designed only for a record player without preamplifiers. Do **not** *use this input for connecting the DVD recorder.*
The DVD recorder or the amplifier may be damaged as a result.

Connecting audio devices to the digital audio sockets



At the back of the DVD recorder there are two digital audio output sockets **OPTICAL OUT** for an optical cable and **COAX OUT** for a coaxial cable (Cinch cable).

These can be used to connect the following:
•) an A/V receiver or an A/V amplifier with a digital multi-channel sound decoder
•) a receiver with two-channel digital stereo (PCM)

Digital multi-channel sound

Digital multi-channel sound offers the best possible sound quality. You will need a multi-channel A/V receiver or amplifier that supports at least one of the audio formats of the DVD recorder (MPEG2 and Dolby Digital).
Consult the operating instructions for your receiver to find out which audio formats it supports.

× **All I can hear from my loudspeakers is a loud distorted noise**
✓ The receiver is not compatible with the digital audio format of the DVD recorder. The audio format of the DVD disc is displayed in the status window when you switch to another language. Playback in six-channel digital surround sound is only possible if the receiver has a digital multi-channel sound decoder.

Initial installation

After successfully connecting your DVD recorder to the TV set and other additional devices as described in the previous chapters, this chapter will show you how to start the initial installation. The DVD recorder automatically seeks and stores all available TV channels.

Switching on additional devices

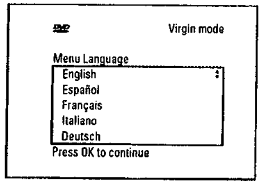
If you have connected additional devices such as a satellite receiver to the aerial cable, switch them on. The automatic channel search will recognise it and save it. Please observe that you must switch on a "test signal" for some additional devices.

No aerial connected

Even if you only want to use the DVD recorder to play back or have only connected a satellite receiver, you must still complete the initial installation. This is necessary so that the basic settings are stored correctly. Once initial installation is complete you can use the DVD recorder as normal.

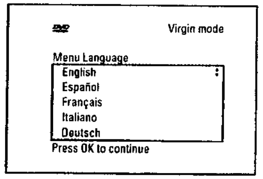
❶ Press **STANDBY-ON** ⏻ on the front of the DVD-recorder
→ 'IS TV ON?' will appear on the display.

→ If the connection was properly made and your TV was **automatically switched** to the programme number for the scart socket, e.g. 'EXT', '0', 'AV', you will see the following picture:



× **My screen is empty.**
✓ Depending on the initialisation procedure it can take some time before the picture appears. Please press **no button** in the meantime.
✓ If the TV set does not automatically switch to the scart socket programme number, manually change to the corresponding programme number on your TV set (see your TV's operating instructions).
✓ Check that the scart cable is connected from the TV set to the **EXT1 TO TV-I/O** socket on the DVD recorder. The **EXT2 AUX-I/O** socket is intended only for additional devices.

❷ Select the desired language for the on-screen menu by pressing ▼ or ▲ .

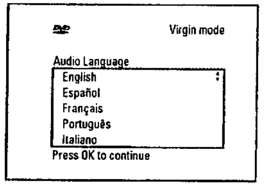


What is an on-screen menu?

The multi-language on-screen menu takes the mystery out of using your new DVD recorder. All settings and/or functions are displayed on your TV screen in the relevant language.

❸ Confirm with **OK** .

❹ Select the desired audio language using ▼ or ▲ .

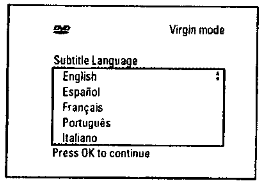


What is an audio language?

The DVD will play the sound in the language you select, provided this language is available on the disc. If it is not available on the disc the first language on the DVD will be used instead. The DVD Video Disc menu, if available, will also be displayed in the language you select.

❺ Confirm with **OK** .

❻ Select the desired language for the subtitles by pressing ▼ or ▲ .

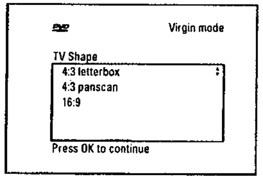


What is the subtitle language?

The subtitles will be displayed in the language you select, provided this language is available on the disc. If it is not available on the disc the fist language on the DVD will be used instead.

❼ Confirm with **OK** .

❽ Select the desired screen format position using ▼ or ▲ .

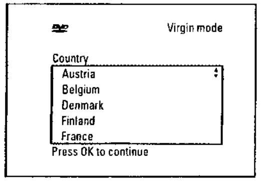


- O ***'4:3 letterbox'***
  for a 'wide-screen' (cinema format) picture with black bars at the top and bottom.
- O ***'4:3 panscan'***
  for a full-height picture with the sides trimmed.
- O ***'16:9'***
  for a wide-screen TV set (screen edge ratio 16:9)

⑨ Confirm with **OK** .

⑩ Select the country of your residence with ▼ or ▲ .

- O If your country does not appear, select '***Other***'.



Virgin mode

Country

Austria
Belgium
Denmark
Finland
France

Press OK to continue

Why do I have to set the country?

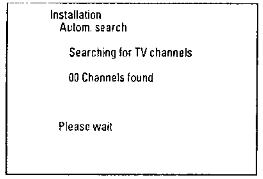
To call up the specific settings for the respective country, you must first install the country.
After the first installation you can set the country in the 'Setup' of the GUIDE Plus+® System only.

⑪ Confirm with **OK** .

→ A screen appers with a message about the connection of the aerial.
It can take some time before this screen appears. Please press **no button** in the meantime.

⑫ After you connect the aerial (or cable TV, satellite receiver, etc.) to the DVD recorder, press **OK** .

→ The automatic TV channel search starts.



Installation
Autom. search

Searching for TV channels

00 Channels found

Please wait

→ 'WAIT' will appear on the display.
Wait until all available TV channels have been found. This can take several minutes.

× **No TV-Stations found yet?**

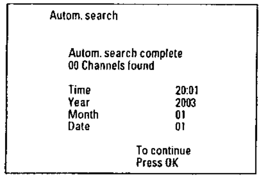
✓ Select channel 1 on the TV set. Can you see the stored TV channel on the TV set?
If not, check the cable connection from the aerial (aerial socket) to the DVD recorder and to the TV set.

✓ Please have patience.
The DVD recorder searches the entire frequency range in order to find and save the largest possible number of TV channels.

✓ If you have not connected an aerial, go through all the basic settings right to the end and then, if you wish, start the automatic search (see 'Automatic TV station search').

→ When the automatic TV channel search is complete, '***Autom. search complete***' will appear on the TV screen along with the number of TV channels found.

→ '***Time***', '***Year***', '***Month***', '***Date***' will then appear on the TV screen. It can take some time before this screen appears. Please press **no button** in the meantime.



Autom. search

Autom. search complete
00 Channels found

Time	20:01
Year	2003
Month	01
Date	01

To continue
Press OK

⑬ Check the displayed settings for '***Time***', '***Year***', '***Month***' and '***Date***' .

- O If required, change the data with the number buttons **0..9** on your remote control.
- O Select the line with ▲ or ▼ .

⑭ If all informations are correct, save by pressing **OK** .

→ '***Dealer demo***' appears on the screen.

- O Select '***Yes***' and confirm with **OK** if you want to see a demonstration of the function of the DVD-Recorder. Playback starts automatically.
  The demontration movie is stored for each language as a title in the 'Media Browser'. If you need additional capacity on the HDD you can delete the demonstration as you delete a titel (recording). Read therefor the section 'Delete titles/recordings from the HDD' in the chapter 'Playback from the HDD'.
- O Select '***No***' and confirm with **OK** if you do not want to see the demonstration movie automatically.

× **Sound may be distorted on some TV channels.**

✓ If the sound is distorted on any of the stored TV channels or if there is no sound at all, the wrong TV system may have been stored for the TV channel. Read 'Manual TV channel search' for information on how to change the TV system.

Further settings relate to the GUIDE Plus+® System. This offers a free interactive guide to the TV programmes available in your area.

To install this system, please read the instructions in the section entitled 'The GUIDE Plus+® System'.

Using a satellite receiver

TV channels from a satellite receiver (connected to scart socket **EXT2 AUX-I/O**) are received on the DVD recorder on programme number '***EXT2***'

If necessary, use the **TUNER** button to switch to the internal tuner. Select programme number '***EXT1***' with **0** on the remote control and then select programme number '***EXT2***' with **CHANNEL −** .
You should select the TV channels to be received by the satellite receiver directly on the receiver itself.

Allocating a decoder

Some TV channels send coded TV signals that can only be viewed properly with a purchased or rented decoder. You can connect such a decoder (descrambler) to your DVD recorder. The following function automatically activates the connected decoder for the TV channel you want to watch.

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Use the **CHANNEL +** and **CHANNEL −** buttons or the number buttons **0..9** on the remote control to select the TV channel for which you want to use the decoder.

- O If necessary, use the **TUNER** button to switch to the internal tuner.

❷ Press the **BROWSER HDD** button and then the **SYSTEM MENU** button on the remote control.

→ The 'SYSTEM MENU' appears.

❸ Select '***Set up***' using ▼ .

❹ Press ▶ to select '***System***'.

❺ Select the line '***Installation***' using ▼ and confirm with ▶ .

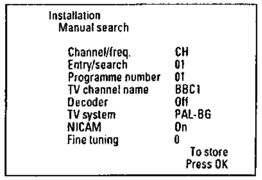
→ A message appears on the screen that this setting will flush the 'Time Shift Buffer'.

- O If the 'Time Shift Buffer ' contains important recordings, save them with the **REC/OTR ●** button first. Read additional information to the 'Time Shift Buffer' in the chapter 'The Time Shift Buffer'.

❻ Select '***Yes***' with ◀ and confirm with **OK** .

- O If the message window was closed, confirm the line with ▶ again.

❼ Select '***Manual search***' using ▼ or ▲ and confirm with ▶ .



Installation
Manual search

Channel/freq.	CH
Entry/search	01
Programme number	01
TV channel name	BBC1
Decoder	Off
TV system	PAL-BG
NICAM	On
Fine tuning	0

To store
Press OK

❽ Select '***Decoder***' using ▼ or ▲ .

❾ Select '***On***' with ▶ .

- O To switch off the decoder use ▶ to select '***Off***' (Decoder switched off).

❿ Confirm with **OK** .

⓫ To end, press **SYSTEM MENU** .

Your decoder has now been allocated to this TV channel.

Connection using a component video (Y Pb Pr/YUV) cable (no progressive scan)

Component video (Y Pb Pr) is the highest quality picture transmission option. This is achieved by dividing the video signal into a luminance signal (Y) and two colour difference signals - red minus luminance (V) and blue minus luminance (U). As a rule, "Cr, Pr" or "R-Y" is used to describe the red difference signal and "Cb, Pb" or "B-Y" the blue difference signal.
These signals are transmitted through separate lines. The connectors of this cable and the corresponding sockets are usually green (luminance, Y), blue (U, Pb, Cb, B-Y), and red (V, Pr, Cr, R-Y).

Attention!
If you choose this type of connection, the DVD recorder must already be connected and completely installed (initial installation complete). Switching of the signal to the **COMPONENT VIDEO OUT** sockets is carried out in a menu that is not yet available during the initial installation.

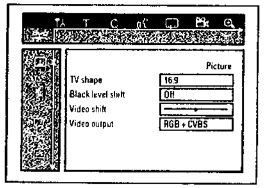
Preparation:
•) The TV set is switched on, and, if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press the **DISC MENU** and then the **SYSTEM MENU** button on the remote control.

→ The menu bar appears.

❷ Select 'ͲȦ' symbol with ◀ or ▶ .

❸ Select the '[☺]' symbol using ▼ or ▲ and confirm with ▶ .


Picture
TV shape 16:9
Black level shift Off
Video shift
Video output RGB + CVBS

❹ Select the line '***Video output***' using ▲ or ▼ and confirm with ▶ .

❺ Select your setting with ▼ or ▲ . If the YPbPr output (YUV signal) is switched on, S-video (Y/C) and video (FBAS/CVBS) signals will not be transmitted simultaneously.
The 'RGB' signal is switched off.

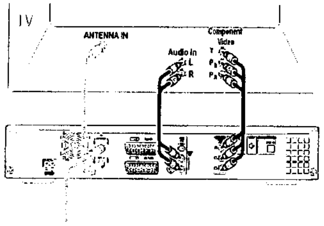
- ○ ***'S-video + YPbPr'***
  Component Video (YUV) and S-Video(Y/C).
  GUIDE Plus+® menus only available on YUV ouput sockets.

- ○ ***'CVBS + YPbPr'***
  Component Video (YUV) and Video (FBAS/CVBS).
  GUIDE Plus+® menus only available on YUV ouput sockets.

With all other settings, the signal is switched off at the **COMPONENT VIDEO OUT** sockets. This will also be displayed as information on the screen.

For more information on the other settings, read section 'Picture settings' ('***Video output***') in chapter 'User preferences'.

❻ Confirm with **OK**.



❼ Use a component video (Y Pb Pr) cable, connect the three cinch sockets (red, blue, green) **COMPONENT VIDEO OUT** at the back of the DVD recorder with the corresponding three component video (interlaced) input sockets of your TV set, usually labelled 'Component Video Input', 'YUV Input', 'YPbPr', 'YCbCr' or simply 'YUV'.

Warning!
Do not confuse these sockets with the five-component RGB sockets (if available) or the yellow video (CVBS/FBAS) socket and the two audio sockets (red/white). The five-component RGB sockets are only provided for the R-G-B-H-V signals (red, green, blue with horizontal and vertical synchronisation impulse).

Please observe the colour sequence
The colours of the sockets at the DVD recorder and the connectors must match those of the socket colours at the TV set (red-red/blue-blue/green-green). If they don't, the colours of the picture may get mixed up or the picture may not be visible.

❽ Use an audio (cinch) cable, connect the red/white cinch socket **AUDIO OUT L/R** at the back of the DVD recorder with the most coloured red/white audio input socket of your TV set (usually labelled 'Audio in' or 'AV in'. See the instruction manual of your TV set.)

❾ If necessary, switch your TV set to the component video (Interlaced) input sockets. If there is a switch or selection on your TV-set between 'Interlaced' and 'Progressive scan' select 'Interlaced'. 'Progressive scan' will be not supported from this DVD-Recorder.
Also consult the instruction manual of your TV set.

→ The menu of the DVD recorder should now appear on the TV screen. If not, check the cable connections and the settings on your TV set.

○ If necessary store this setting on your TV set.

❿ End with **SYSTEM MENU**.

Manual TV channel search

In some cases, not all of the available TV channels may have been found and stored during initial installation. In this case, you will need to search for and store the missing or coded TV channels manually.

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press the **DISC MENU** button and then the **SYSTEM MENU** button on the remote control.
→ The 'SYSTEM MENU' appears.

❷ Select '***Set up***' using ▼ .

❸ Press ▶ to select '***System***'.

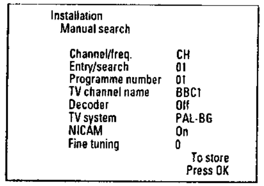
❹ Select the line '***Installation***' using ▼ and confirm with ▶ .
→ A message appears on the screen that this setting will flush the 'Time Shift Buffer'.

○ If the 'Time Shift Buffer ' contains important recordings, save them with the **REC/OTR ●** button first. Read additional information to the 'Time Shift Buffer' in the chapter 'The Time Shift Buffer'.

❺ Select '***Yes***' with ◀ and confirm with **OK**.

○ If the message window was closed, confirm the line with ▶ again.

❻ Select '***Manual search***' using ▼ or ▲ and confirm with ▶ .



```
Installation
  Manual search

   Channel/freq.       CH
   Entry/search        01
   Programme number    01
   TV channel name     BBC1
   Decoder             Off
   TV system           PAL-BG
   NICAM               On
   Fine tuning         0
                          To store
                          Press OK
```

❼ In '***Channel/freq.***', select the desired display using ▶ .
'***Freq.***'(Frequency), '***CH***'(Channel), '***S-CH***'(Special/hyperband channel)

❽ In '***Entry/search***', enter the frequency or channel of the TV station using the number buttons **0..9** .

○ Press ▶ in the line '***Entry/search***' to start the automatic search.
→ A changing channel number/frequency number will appear on the TV screen.

Continue the automatic search until you have found the TV channel you are looking for.

❾ Using ◀ or ▶ in '***Programme number***', select the programme number you want to use for the TV channel, e.g. '***01***'.

❿ Press **OK** to store the TV channel.

* ***The message 'EPG PRESETLIST INCOMPLETE' appears on the screen***
✓ In the GUIDE Plus+® System the allocation from the TV channels ('***Editor***' screen) can not be finished (no data available). Check the allocation in the GUIDE Plus+® System ('***Editor***' screen) as soon as GUIDE Plus+® data are available.

⓫ To search for other TV channels, begin again at ❽ .

○ **Change the name of a TV channel:**
- In '***TV channel name***', press ▶ .
- Select the desired character position using ◀ or ▶ .
- hange the character at the desired position with ▼ or ▲ .
- Select the next character position in the same way.
- Confirm with **OK** .

○ **Change the TV system of the TV channel:**
- In '***TV system***', use ◀ or ▶ to select the TV system that produces the least distortion of picture and sound.

○ **NICAM**
- If reception is poor and the sound distorted you can turn off NICAM.
In '***NICAM***', select '***Off***' using ▶ .

○ **Fine tuning**
- You can try fine tune the TV channel manually with ◀ , ▶ in the line '***Fine tuning***'.

⓬ To end, press **SYSTEM MENU** .

Sorting TV channels automatically (Follow TV)

This function changes the order of the TV channels stored in your DVD recorder to match the order on the TV set.
This only works if the DVD recorder (**EXT1 TO TV-I/O** socket) and the TV set **are connected with a scart cable**.

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press the **BROWSER HDD** and then the **SYSTEM MENU** button on the remote control.
→ The 'SYSTEM MENU' appears.

❷ Select '***Set up***' using ▼ .

❸ Press ▶ to select '***System***'.

❹ Select the line '***Installation***' using ▼ and confirm with ▶ .
→ A message appears on the screen that this setting will flush the 'Time Shift Buffer'.

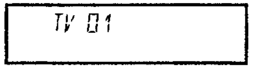
O If the 'Time Shift Buffer ' contains important recordings, save them with the **REC/OTR ●** button first. Read additional information to the 'Time Shift Buffer' in the chapter 'The Time Shift Buffer'.

❺ Select '***Yes***' with ◀ and confirm with **OK** .

O If the message window was closed, confirm the line with ▶ again.

❻ Select line '***Follow TV***' with ▼ or ▲ . and confirm with the ▶ button.

❼ Confirm the message on the screen with **OK** .
→ 'TV 01' will appear in the DVD recorder display.



❽ Select programme number '1' **on the TV set**.

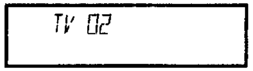
× **I cannot switch my TV set to programme number '1'**
✓ If you have connected additional devices to the **EXT2 AUX-I/O** socket, please disconnect these devices. Other connected devices may have switched the TV set to the programme number of the scart socket.

❾ Confirm with **OK** on the DVD recorder remote control.
→ 'WAIT' will appear in the display.

→ The DVD recorder compares the TV channels on the TV set and the DVD recorder.
If the DVD recorder finds the same TV channel as on the TV set it stores it at 'P01'.

× **'NOTV' will appear in the display.**
The DVD recorder is not receiving a video signal from the TV set.
✓ Chech the connectors at both ends of the scart cable.
✓ Check your TV's operating instructions to see which scart socket is used for video signals.
✓ If the problem persists, you won't be able to use this feature.
Please read 'Sorting and deleting TV channels manually'.

❿ Wait until for example 'TV 02' appears in the display.



⓫ Select the next programme number **on the TV set**, e.g. '2'.

⓬ Confirm with **OK** on the DVD recorder remote control.

O If you confirmed the wrong TV channel, you can delete the last allocation with ◀ .

⓭ Repeat steps ❿ to ⓬ until you have assigned all the TV channels from your TV set.

⓮ To end, press **SYSTEM MENU** .

× ***'New preset, please switch to standby'* appears on the screen**
✓ In order to transfer the new TV channel order to the GUIDE Plus+® system, it is necessary to switch off the DVD recorder (**STANDBY ⏻**). Wait for approx. 4 minutes before you switch the DVD recorder on again.
✓ If this message appears after you switch on the DVD recorder, it was not possible to complete the transfer process. Switch off the DVD recorder using **STANDBY ⏻** .

Automatic TV channel search

If the channel assignments of your cable or satellite TV provider change or if you are reinstalling the DVD recorder, e.g. after moving house, you can start this procedure again. This will replace the stored TV channels with the new ones.

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press the **BROWSER HDD** button and then the **SYSTEM MENU** button on the remote control.
→ The 'SYSTEM MENU' appears.

❷ Select '***Set up***' using ▼ .

❸ Press ▶ to select '***System***'.

❹ Select the line '***Installation***' using ▼ and confirm with ▶ .
→ A message appears on the screen that this setting will flush the 'Time Shift Buffer'.

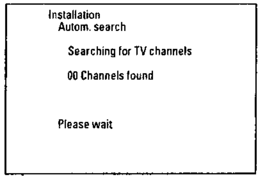
O If the 'Time Shift Buffer ' contains important recordings, save them with the **REC/OTR ●** button first. Read additional information to the 'Time Shift Buffer' in the chapter 'The Time Shift Buffer'.

❺ Select '***Yes***' with ◀ and confirm with **OK** .

O If the message window was closed, confirm the line with ▶ again.

❻ Select '***Autom. search***' using ▼ or ▲ .

❼ Press ▶ .
→ The automatic TV channel search starts. This allows the DVD recorder to save all available TV channels. This procedure may take several minutes.



```
Installation
  Autom. search

    Searching for TV channels

    00 Channels found


    Please wait
```

→ When all the TV channels have been found, '***Autom. search complete***' will appear on the TV screen.

❽ To end, press **SYSTEM MENU** .

You can read about how to search for a TV channel manually in 'Manual TV channel search'.

Sorting and deleting TV channels manually

With this function you can rearrange the TV channels already stored or to delete TV channels you don't want or those with poor reception.

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press the **BROWSER HDD** button and then the **SYSTEM MENU** button on the remote control.
→ The 'SYSTEM MENU' appears.

❷ Select '***Set up***' using ▼ .

❸ Press ▶ to select '***System***'.

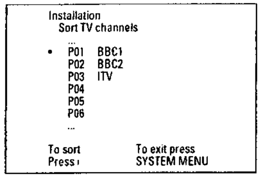
❹ Select the line '***Installation***' using ▼ and confirm with ▶ .
→ A message appears on the screen that this setting will flush the 'Time Shift Buffer'.

O If the 'Time Shift Buffer ' contains important recordings, save them with the **REC/OTR ●** button first. Read additional information to the 'Time Shift Buffer' in the chapter 'The Time Shift Buffer'.

❺ Select '***Yes***' with ◀ and confirm with **OK** .

O If the message window was closed, confirm the line with ▶ again.

❻ Select '***Sort TV channels***' using ▼ or ▲ and confirm with ▶ .



```
Installation
  Sort TV channels
      ...
•     P01   BBC1
      P02   BBC2
      P03   ITV
      P04
      P05
      P06
      ...

To sort           To exit press
Press ı           SYSTEM MENU
```

❼ Using ▼ or ▲ select the TV channel that you want to delete or whose order you want to change.

❽ Confirm with ▶ .

O **Deleting TV channels**
Unwanted channels or those with poor reception can be deleted using the red function button.

❾ Using ▼ or ▲ , shift the TV channel to the desired position and press the ◀ button.
→ The DVD recorder will insert the TV channel.

❿ Repeat steps ❼ to ❾ until you have resorted/deleted all the TV channels you want.

⑪ To store, press **OK** .

⑫ To end, press **SYSTEM MENU** .

- × ***'New preset, please switch to standby'*** **appears on the screen**
- ✓ In order to transfer the new TV channel order to the GUIDE Plus+® system, it is necessary to switch off the DVD recorder (**STANDBY** ⏻). Wait for approx. 4 minutes before you switch the DVD recorder on again.
- ✓ If this message reappears after you switch on the DVD recorder, it was not possible to complete the transfer process. Switch off the DVD recorder using **STANDBY** ⏻ .

Setting the language

For the basic setting of DVD playback, you can select the language for the subtitles and the audio language.

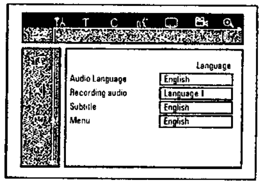
Please note that with some DVDs the audio language and/or subtitle language can be changed only via the DVD menu.
For bilingual shows, you can also select the sound channel of the TV station via the internal tuner (**TUNER** button) for recording or playback.

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

① Press the **BROWSER HDD** button and then the **SYSTEM MENU** button on the remote control.
→ The menu bar appears.

② Select '⫯ʎ' symbol with ◀ or ▶ .

③ Select line '🗨' with ▼ or ▲ and confirm with the ▶ button.



Language

Audio Language English
Recording audio Language I
Subtitle English
Menu English

④ Select the appropriate line and confirm with ▶ .

- ○ ***Audio Language***
  The DVD will play back in the language you have chosen.
- ○ ***'Subtitle'***
  Subtitle language
- ○ ***'Menu'***
  You have the option of setting one of the displayed languages for the on-screen menu (OSD). However, the DVD recorder display will only display English text regardless of this setting.
  The language can also be set in the installation menu from the GUIDE Plus+® system.

To activate the new language you must switch the DVD-Recorder off and on again (button **STANDBY** ⏻).

⑤ Select the appropriate setting using ▼ or ▲ and confirm with **OK** .

⑥ To end, press **SYSTEM MENU** .

Setting the time

If the display shows an incorrect time or '--:--', the time and date must be reset manually.

SMART CLOCK

'SMART CLOCK' automatically sets the time and date using the information transmitted by the TV channel. Normally the TV channel stored at programme number 'P01' is used. In the ***'Clock preset'*** *line you can select the programme number (channel name) whose TV channel transmits this information.*
If the time/date is not displayed correctly you need to choose the ***'Off'*** *setting in the* ***'Clock preset'*** *line and set the date and time manually.*

① Press the **BROWSER HDD** button and then the **SYSTEM MENU** button on the remote control.
→ The 'SYSTEM MENU' appears.

② Select '***Set up***' using ▼ .

③ Press ▶ to select '***System***'.

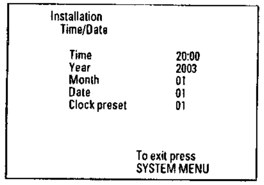
④ Select the line '***Installation***' using ▼ and confirm with ▶ .
→ A message appears on the screen that this setting will flush the 'Time Shift Buffer'.

- ○ If the 'Time Shift Buffer ' contains important recordings, save them with the **REC/OTR ●** button first. Read additional information to the 'Time Shift Buffer' in the chapter 'The Time Shift Buffer'.

⑤ Select '***Yes***' with ◀ and confirm with **OK** .

- ○ If the message window was closed, confirm the line with ▶ again.

⑥ Select '***Time/Date***' using ▼ or ▲ and confirm with ▶ .



Installation
Time/Date

Time 20:00
Year 2003
Month 01
Date 01
Clock preset 01

To exit press
SYSTEM MENU

⑦ Change the time in '***Time***' using the number buttons **0..9** on your remote control.

⑧ Check '***Year***', '***Month***' and '***Date***' in the same way. Select the entry field with the ▼ or ▲ button.

- × **Time/date is displayed incorrectly despite manual setting**
- ✓ With 'SMART CLOCK', time/date is transferred from the TV channel saved on 'P01' and automatically corrected.
  You can either enter another TV channel for transferring the data or disable the function.
  In the line '***Clock preset***' select the relevant TV channel with ◀ or ▶ . To disable, select '***Off***'.

⑨ Check the displayed settings and confirm with **OK** .
→ '***Stored***' will appear briefly on the screen.

⑩ To end, press **SYSTEM MENU** .

General information

Your DVD Recorder is equipped with the GUIDE Plus+® System. The GUIDE Plus+® System offers a free interactive electronic programme guide that lists all the TV programmes available in your area. You can also use the GUIDE Plus+® System to program your DVD recorder to record your favourite shows.

Press **GUIDE/TV** to see a summary of all the TV programmes currently being shown on the various TV channels. For the summary, you can either display all shows for a particular start time or sorted according to category.

For the GUIDE Plus+® System to operate correctly, it is necessary for the DVD recorder to collect the necessary data. The DVD recorder may take up to 24 hours to do this.

Please note the following:
•) All the TV channels must already have been installed.
•) The TV channel that transmits the GUIDE Plus+® system information must be installed.
If you did not find your country in this list, no TV channel will be provided the GUIDE Plus+® system information.
On the internet page http://www.europe.guideplus.com you will find further informations and tips.

Country/City (Language)	TV-channel
Deutschland	Eurosport
Osterreich	Eurosport
Schweiz (Deutsch)	Eurosport
United Kingdom	ITV
France	Canal+
España	Tele 5
Nederland	Eurosport
Eindhoven	Music Factory (TMF)
Rotterdam	Music Factory (TMF)
Amsterdam	Music Factory (TMF)
Belgique (Français)	Canal+
België (Nederlands)	Music Factory (TMF)

•)The time and date must have been set.
•)The country and the local post code must have been set in the GUIDE Plus+® system .
•)The aerial/cable network must be connected; it must be possible to receive TV channels.
•)The DVD recorder must be connected to the mains
•)The DVD recorder must be switched to standby with the **STANDBY** ⏻ button.
•) If you have connected an external receiver (satellite receiver, set-top box, cable TV box,...), it must be switched on and tuned to the right TV channel (see table above).

Setting up the GUIDE Plus+® System

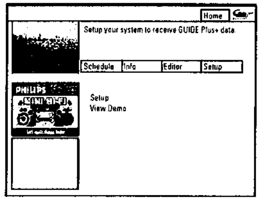
Below we'll tell you how to set up the GUIDE Plus+® System to suit your own particular needs and how to install the external receiver (satellite receiver, ...) if you have one.

① Switch on the TV set. If required, select the programme number for the DVD recorder.

② Press the **GUIDE/TV** button on the remote control.
→ The '***Grid***' screen will appear.
If the GUIDE Plus+® system has not been installed yet, the '***Setup***' screen will appear and you can start with the installation right now.

- If an 'Installation-screen' appears, select the settings described in the next chapter and follow the instructions on the screen.

③ Press ▲ . Select the setting '***Setup***' with ▶ . This setting is located on the second menu page.

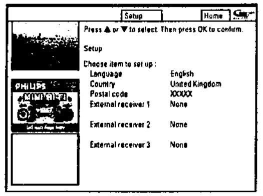


Setup your system to receive GUIDE Plus+ data.
Setup
View Demo

④ Select one of the following options using ▼ or ▲ and confirm with **OK** .

- '***Setup***'
  Installation of the GUIDE Plus+® system.
  Continue reading in the next chapter.
- '***View Demo***'
  At this point you will be introduced to the functions of the GUIDE Plus+® system. This will be done using stored demo data.
  If you start the demo, programmed recordings can be deleted. By pressing **OK** during the presentation, you can proceed directly to the installation of the GUIDE Plus+® system. Read the next section.

'*Setup*'



Press ▲ or ▼ to select. Then press OK to confirm.
Setup
Choose item to set up :
Language English
Country United Kingdom
Postal code XXXXX
External receiver 1 None
External receiver 2 None
External receiver 3 None

Check the data displayed on the screen. If necessary, you can change these. To do so, select the corresponding line with ▼ or ▲ .

'*Language*'

Here you can change the language for the on-screen menu.

① Press **OK** .

② Select the desired language using ▼ or ▲ and confirm with **OK** .

③ Press **OK** to return to the '***Setup***' screen.

'*Country*'

Select the country you currently live from the list. The DVD recorder needs this information to load the right channel list.

① Press **OK** .

② Select the country you live in using ▼ or ▲ and confirm with **OK** .

③ Press **OK** to return to the '***Setup***' screen.

'*Postal code*'

In order to adjust the GUIDE Plus+® system correctly, it is necessary to know your current location with the TV channels available. Using the local post code and the country, the DVD recorder can automatically make the settings.

① Press **OK** .

② Choose the entry position using ▶ , ◀ . Select the local post code of your location using ▲ , ▼ , or the number buttons **0..9** .

- Depending on the country you select, you can also enter letters using ▼ or ▲ .

× **I cannot enter a local post code**
✓ You have selected a country in which none of the channels transmits GUIDE Plus+® data yet.

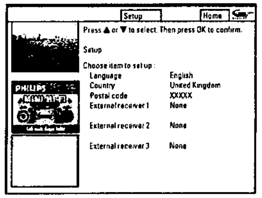
③ Confirm the local post code with **OK** .

④ Press **OK** to return to the '***Setup***' screen.

'*External receiver 1*'

- How you install the external receiver you will read in the next chapter.
- If you have no external receiver connected, read the section 'Finalise set-up'.

Installation of the '*External receiver 1*'



Press ▲ or ▼ to select. Then press OK to confirm.
Setup
Choose item to set up :
Language English
Country United Kingdom
Postal code XXXXX
External receiver 1 None
External receiver 2 None
External receiver 3 None

If you have connected an external receiver (satellite receiver, set-top box, cable TV box), you must also install it in the GUIDE Plus+® system. TV programmes (TV channels) that you can only watch via the receiver can also be displayed in the GUIDE Plus+® system and be programmed for recording.
You can connect up to three external receivers to the DVD-Recorder.

① Select with ▼ or ▲ in the '***Setup***'screen the line '***External receiver 1***' and confirm with **OK** .

② Read the information on the screen and confirm with **OK** .

③ Select the type of the external receiver. This setting serves to preselect the type used.

Which types can I choose?
This selection depends on the country and the GUIDE Plus+® system provider. Therefore, some types may have no function.
'***Cable***': *Cable receiver, cable box.*
'***Satellite***': *Analogue or digital satellite receiver.*
'***Terrestrial***': *Digital terrestrial decoder box.*
'***None***': *No external device connected.*

④ Confirm with **OK** .
If you selected '***None***', there is nothing further you need to do here. Read on in the section entitled 'Continue set-up'.
Otherwise, you should continue here.

⑤ Select your provider from the list.

- If you do not have a provider, select '***No provider***'

⑥ Confirm with **OK** .

⑦ Select the brand of your external receiver from the list. If, additionally your provider is printed on your receiver (e.g. Sky,...), you must choose the provider as brand.

- Depending on the type and provider you selected, a limited selection will appear.

O Browse through the pages of the list using ▶▶I , I◀◀ .

× **My brand is not included in the list**

✓ Select '***Satellite***' and as provider '***No provider***'.
You will see a list of all stored brands.

✓ If you do not find your brand, please proceed as follows:

- Select '***None***'. You will find this setting at the end of the list..
- Tune your external receiver to the TV channel which transmits the GUIDE Plus+® data (see table in the section 'General information'). If this TV channel is available at the internal tuner of the DVD-recorder, select this channel.
- Wait till the GUIDE Plus+® data is loaded (24 hours) and search for your brand again.
  The control data of the external receivers are automatically updated (completed) via the GUIDE Plus+® system. This is done through the aerial, the cable, or the external receiver. You do not need to bring the device to a service centre.
- If your brand is still missing, note the type and manufacturer of your external receiver and call the customer support service in your country. You will find the telephone number on the back of this instruction manual.

❽ Press **OK** .

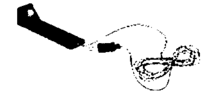
❾ Select the input socket of the DVD recorder to which the receiver is connected.

× **My external receiver is connected only via aerial cable**

- Press ▶▶I to move to the next page.
  Confirm '***Antenna (RF lead)***' using **OK** .
- Enter the channel number under which the external receiver is stored in the DVD recorder. (e.g.: channel number '**P 04**'). Use the number buttons **0..9** , or ▼ , ▲ , ◀ , ▶ .
  If the external receiver is not allocated to a channel number, you must search and store it in the DVD recorder as if it were a new TV channel. Read section 'Search TV channels manually'. Please make sure that the receiver remains switched on during search and, if necessary, switch it on to a 'test signal'.

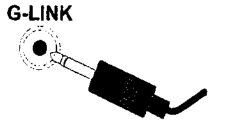
❿ Confirm with **OK** .

Connecting G-LINK transmitter

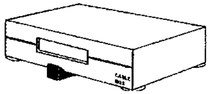


The external receiver (satellite receiver, set-top box, cable TV box) is controlled via the DVD recorder with the G-LINK cable (supplied). This means you can record TV shows that are received only through the external receiver.
Connection of the G-LINK cable enables the GUIDE Plus+® system to show the correct guide listing.

❶ Connect the G-LINK cable to the **G-LINK** socket at the back of the DVD recorder.



❷ Position the G-LINK transmitter in front of the external receiver so that the control signal (IR signal) can be transmitted and received by the receiver unhindered.



How do I find the right position?

If the position of the remote (IR) receiver is indicated on your external receiver (IR, remote sensor, or such like), place the transmitter about 1 to 10 cm in front of it.

If the position is not indicated, proceed as follows:

- *Switch off the external receiver.*
- *Point the remote control at the front of the external receiver.*
- *Move the remote control slowly along the front while repeatedly pressing the on/off button.*
- *When the external receiver switches on or off, you've found the receiver.*
- *Attach the G-LINK transmitter about one to 10 cm in front of it.*

❸ Switch the receiver on and select programme number 02 on the receiver or using its remote control.

× **My external receiver does not display the programme number**
During installation, the external receiver will be switched to a different programme number. If the receiver does not display the programme number, you must check the 'Video window' (left top corner in the GUIDE Plus+® system) to see whether switching has taken place.

- Select on the DVD-Recorder the socket where the receiver is connected using **CHANNEL +** , **CHANNEL −** (e.g. *E2*for **EXT2 AUX-I/O**)
- Please check the TV show in the 'Video window' in the left top corner of the screen.
- Check whether the picture changes during the next step (**OK** button).

❹ Read the information on the screen carefully.
Confirm with **OK** .

→ The DVD recorder will now attempt to use the G-Link connection on the external receiver to select a different programme number (e.g.12). This programme number depends on your external receiver.

❺ Has the external receiver been switched to the programme number displayed on the screen?
If this is the case, select '***YES***'.
If no switching has taken place, select '***NO***'.

× **My external receiver has not switched to the other programme number.**

- Check that the external receiver is connected and switched on.
- Check the connection and position of the G-LINK transmitter.
- For another attempt with a new code of the chosen brand, select '***NO***'.
- Confirm with **OK** on the remote control.
- If the receiver has not switched yet, select '***NO***' again and confirm with **OK** . It may take several attempts for a receiver brand.

If you return to the setup screen after confirming '***NO***', your receiver may not have been installed. Check the connections again.

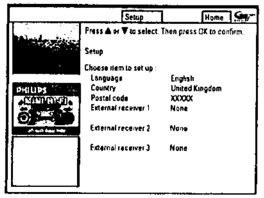
- Tune your external receiver to the TV channel which transmits the GUIDE Plus+® data (see table in the section 'General information'). If this TV channel is available at the internal tuner of the DVD-recorder, select this channel.
- Wait till the GUIDE Plus+® data is loaded (24 hours) and try the switch over again.
  The control data of the external receivers are automatically updated (completed) via the GUIDE Plus+® system. This is done through the aerial, the cable, or the external receiver. You do not need to bring the device to a service centre.
- If your receiver still does not switch, note the type and manufacturer of your external receiver and call the customer support service in your country. You will find the telephone number on the back of this instruction manual.

❻ Your external receiver has now been installed.

❼ Press **OK** to return to the setup overview.

× **I want to install additional external receivers**
When installing additional external receivers, please observe the following: The external receiver which is controlled by the G-LINK transmitter must be **below** the other additional receivers. The IR(infrared) remote control signal is reflected diagonally upwards and can therefore be used to control additional external receivers which are on top.

Finalise set-up



Press ▲ or ▼ to select. Then press OK to confirm.

Setup

Choose item to set up :

Language	English
Country	United Kingdom
Postal code	XXXXX
External receiver 1	None
External receiver 2	None
External receiver 3	None

❶ Check the settings shown on the screen.
If the settings are not correct, choose the line in which you want to change the settings and confirm with **OK** .

❷ Press the green function button to leave the screen.

O If you want to view a demonstration of the GUIDE Plus+® system select '***View Demo***' with ▼ and confirm with **OK** .
If you start the demo, programmed recordings can be deleted.

O If you do not want to see the demonstration of the GUIDE Plus+® system, end using **GUIDE/TV** .

❸ This completes the set-up process for the GUIDE Plus+® system.

❹ Switch the DVD-recorder to the TV channel which transmits the GUIDE Plus+® data. The right TV-channel for your country you will in the table in the chapter 'The GUIDE Plus+® system' in the section 'General information'.
Leave the DVD recorder switched on during the night to load the GUIDE Plus+® data.
The information will be available in the next 24 hours.

❺ If data are available check in the '***Editor***' screen that the TV channel which transmits the GUIDE Plus+® is allocated to the right programme number. Change the programme number if necessary.

What must I pay attention to when installing an external receiver for the first time?

•) The receiver must be switched on.

•) If you can switch between 'TV' and 'Radio' on the receiver, select 'TV'.

•) Select the TV channel that transmits the GUIDE Plus+® data on the receiver. You will find the corresponding TV channel for your country in the table in section 'General Information' in chapter 'The GUIDE Plus+ System'.

•) On the DVD recorder, select the programme number of the input socket to which the external receiver is connected:
*'**E2**' Scart socket at the back of the DVD recorder* **EXT2 AUX-I/O**
'EXT 1' Scart socket at the back of the DVD recorder **EXT1 TO TV-I/O**

•) If the external receiver is only connected to the aerial socket, you must select the programme number on the DVD recorder under which the external receiver is stored.

•) The DVD recorder must be switched on.

•) If GUIDE Plus+® data were loaded, switch the DVD-Recorder off with the **STANDBY ⏻** *button for approx.10 minutes. During this time, the data will be stored in a memory to prevent them from being erased in case of malfunction (power failure).*

You must observe this information only when installing the receiver for the first time. At this point, there is no GUIDE Plus+® data available yet in order to automatically detect the TV channel that delivers the GUIDE Plus+® data.

Using the GUIDE Plus+ ® System

General

The GUIDE Plus+® System provides you with a free on-screen listing for all the TV channels in your location. You can also use it to control a connected external receiver (satellite receiver, set top box, cable box).

The information of the GUIDE Plus+® System is divided in six screen components:
•) Function buttons (colour panels) along the top of the screen. These correspond to the colour buttons of the remote control
•) The video window
•) Programme information or instructions for use
•) A line for the selection of available GUIDE Plus+® menus
•) The channel guide with the current listings
•) Advertising information or instructions on the GUIDE Plus+® system

Calling up the GUIDE Plus+ ® System:
Press **GUIDE/TV** on the remote control.

Closing the GUIDE Plus+ ® System:
•) Press **GUIDE/TV** to leave the GUIDE Plus+® System and continue viewing the program you were viewing before you called up the GUIDE Plus+® System.

Using the buttons on the front of the DVD recorder
Calling up the GUIDE Plus+® System: **GUIDE** button.
Closing the GUIDE Plus+® System: **GUIDE** button.
Confirm the function: **OK** button.
Red function button: ● button.
Cursor buttons: **UP**, **DOWN**, **LEFT**, **RIGHT**.

The navigation in the GUIDE Plus+® System

Press **GUIDE/TV** to view the main menu. Press ▲ to select the menu line. You can select one of the following functions with ◀ or ▶. Press at the desired function the ▼ button for confirmation.

O *'Grid'*:
Standard GUIDE Plus+® system screen (programme guide)

O *'Search'*
TV shows sorted by category (movies, sport, etc.)

O *'Schedule'*:
Scheduled (pre-programmed) recordings

O *'Info'*:
Additional special functions in the GUIDE Plus+® system.

O *'Editor'*:
Display/Change the channel settings for the *'Grid'* screen

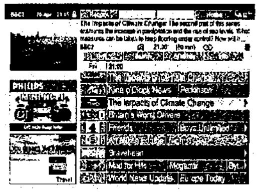
O *'Setup'*:
For changing the basic settings. Read further information in the chapter 'Set up the GUIDE Plus+® System'.

Function buttons (colour buttons)
If GUIDE Plus+® information has been loaded, function buttons (colour fields) at the top of the screen indicate that you can perform various actions in the GUIDE Plus+® screen. Red, Green, Yellow, Blue whose function depends on the respective menu. Always check the function (description) in the corresponding colour field before pressing a button.

If no colour buttons are displayed, pressing them will have no effect.

INFO button
An **INFO** button is also available. If additional information is available (symbol i on the screen), you can use this button to retrieve the information.

The *'Grid'* screen



This list appears when you press the **GUIDE/TV** button. You can view the current listing for all the TV channels from today to the same day next week.

ATTENTION!
If data from the GUIDE Plus+® system is already available after the initial installation, check the allocation of programme numbers to the channels in the *'Editor'* screen.
Read therefore the section 'The *'Editor'* screen'.
If the TV-channel that transmits the GUIDE Plus+® data was allocated to the wrong programme number, no further GUIDE Plus+® data can be loaded.

❶ Press **GUIDE/TV**. The *'Grid'* screen will appear.
→ In the top left corner the picture of the TV channel appears which was selected before you call up the GUIDE Plus+® system.

❷ Select the TV channel you require with ▲ or ▼.

O You can use the number buttons **0..9** to select a TV channel directly.

O You can use the ▶▶| and |◀◀ buttons to scroll a page at a time.

Choosing a TV channel from a listing
- Press the yellow function button.
- An overview of all TV channels appears.
- Select the TV channel you want using ▶, ◀, ▼, ▲.
- Confirm with **OK**.

❸ Use the ◀ or ▶ button to select the show you want.

O You can hold down ◀ or ▶ to browse faster through the start times.

O If you hold the button |◀◀ or ▶▶| pressed, you can switch forward or back one day.

I want to call the additional information/advertisement on the left hand side of the screen
Press ◀ in the line of the TV channel repeatedly, until the additional information/advertisement on the left hand side of the screen is highlighted. You can toggle between the two sets of information using ▼, ▲.
You can exit these areas with ▶ or with the blue function button.

Function buttons (colour buttons) in the *'Grid'* screen

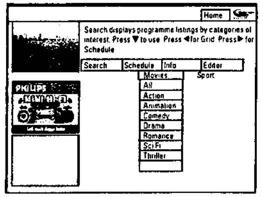
You can use the colour buttons on the remote control to select the following:

***'Record'* (red button)**:
The highlighted show will be programmed for automatic recording. It appears in the *'Schedule'* screen.
You can store up to 6 TV shows for recording.
You can store up to 30 TV shows for recording.

***'Watch'* (green button)**:
The highlighted TV show is stored as a reminder using the start time and appears in the *'Schedule'* screen in a different colour than the *'Record'* recording.
When the start time is reached, a message appears on the GUIDE Plus+® screen. You can store up to three such events.

***'Home'* (blue button)**:
Return to the current time in the listing (*'Grid'* screen).

The *'Search'* screen



Search displays programme listings by categories of interest. Press ▼ to use Press ◀ for Grid Press ▶ for Schedule

This menu lets you access show listings organised by category. This is an even easier way of searching the show you want to watch.
Make your selection from a general category (Movies, Sport, Children's, Series, etc.) and a detailed category (Adventure, Comedy, Drama, etc.)

Colours of the categories:
Purple-Movies
Green-Sport,
Blue-Children's,
Teal-Others,
The Sort service gives you show listings for the next 7 days.

❶ Select the category with ◀, ▶.
Confirm with ▼. Select the minor category with ▼, ◀, ▶.

❷ Confirm with **OK**

❸ Use the ▼, ▲, ◀, ▶ buttons to scroll through the shows.

× ***'No Program was found'* appears on the screen**
There is no TV show today that matches the selected category.
- Select a different day with ▶, ◀.
- Press ▲ to return to the *'Search'* screen.

Function buttons (colour buttons) in the *'Search'* screen

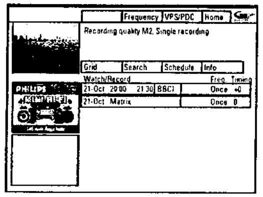
If you have highlighted a show you can use the coloured buttons to perform the following actions:

***'Record'* (red button)**:
The highlighted show will be programmed for recording. It appears in the *'Schedule'* screen.

***'Watch'* (green button)**:
The highlighted TV show is stored as a reminder using the start time and appears in the *'Schedule'* screen in a different colour than the *'Record'* recording.
When the start time is reached, a message appears on the GUIDE Plus+® screen. You can store up to three such TV shows.

***'Home'* (blue button)**:
Return to the current time in the listing (*'Grid'* screen).

The '*Schedule*' screen



Recording quality M2, Single recording

Watch/Record				Freq.	Timing
21-Oct	20:00	21:30	BBC1	Once	+0
21-Oct	Matrix			Once	0

This menu displays the shows that are set to record or as a reminder to watch them. You can clear recordings or make changes using the function buttons. Moreover, you can manually program recordings. Depending of the type of programming a recording appears:

Programming from the '*Grid*' screen:

'*21-Oct*': Day and month of the recording
'*Matrix*': Title of the show (if it is transmitted)

Programming from the '*Schedule*' screen:

'*21-Oct*': Day and month of the recording
'*20:00*': Start time
'*21:30*': Stop time
'*BBC1*': TV channel

Additionally appears to each programmed recording:
'*Freq.*':
Frequency '*Once*'..once/'*M-F*'..daily (Monday to Friday)/'*Mon*'..weekly (every week on the same day, e.g. Monday)
'*Timing*': In case an extended switch-off time has been entered or 'VPS/PDC' (V-P) is switched on.

Function buttons (colour buttons) in the '*Schedule*' screen

You can select between programming with ShowView® (red button) or manual programming (green button).

If you selected an already programmed TV show, you can make changes using the colour buttons of the remote control.
The function of the colour buttons will change depending on the tile you select. Always check the function (description) in the corresponding colour field before pressing a button.

❶ Press ▼ .
Select the corresponding recording with ▼ , ▲ .

❷ Select the corresponding tile with ◀ , ▶ .

left tile
red button: clear the recording
green button: change the data

center tile
yellow button: change the TV channel

right tile
green button: repeat
yellow button: extend switch-off time, switch VPS/PDC on/off

The '*Info*' screen

This screen can be divided in subcategories. These depend on the information provided by the GUIDE Plus+® system. If there are no categories available, no data has been provided yet. Try visiting this page later.

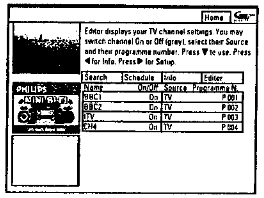
❶ Press ▼ .
Select the corresponding subcategory with ▼ , ▲ .

❷ Select from the displayed data with ▼ or ▲ .

❸ Confirm using **OK** to receive more information.

❹ Return to the '*Info*' screen by pressing the red function button ('*Info*').

The '*Editor*' screen



Editor displays your TV channel settings. You may switch channel On or Off (grey), select their Source and their programme number. Press ▼ to use. Press ◀ for Info. Press ▶ for Setup.

Name	On/Off	Source	Programme N.
BBC1	On	TV	P 001
BBC2	On	TV	P 002
ITV	On	TV	P 003
CH4	On	TV	P 004

Here you can allocate the programme numbers to the corresponding TV channels and switch them on/off for the programme listings ('*Grid*' screen). Moreover, you can define the use of the TV channels on the external receiver.

❶ Press ▼ .

❷ Select the TV channel you want to change using ▼ , ▲ .
   ○ Use the ◀ and ▶ buttons to switch between tiles.

left tile
This tile contains the TV channels with their short descriptions and indicates whether the TV channel is displayed in the programme listing ('*Grid*' screen) or not.
   ○ You can switch on/off a TV channel for the '*Grid*' screen using the red function buttonn

right tile
This tile contains the TV channel properties and the programme numbers. You can modify channel allocation or assign an external receiver. In order to assign a receiver, it must be already installed in the GUIDE Plus+® system.
To change allocations, proceed as follows:

❶ Select the TV channel you want to change using ▼ , ▲ .

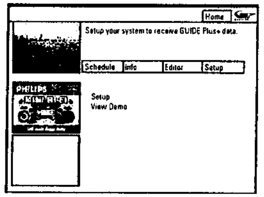
❷ Press the green function button.

❸ Enter the programme number of the TV channel using the number buttons **0..9** . You can only enter programme numbers of TV channels that have already been installed.

Entering the TV-channel of an external receiver
- Select the TV channel you want to watch only through the external receiver using ▼ , ▲ .
- Choose the corresponding source using the red function button. This function button is only available when at least one external receiver has been installed. Read section 'Setting up the GUIDE Plus+® system' on how to install an external receiver.
- Press the green function button. Enter the programme number of the TV channel which you would also enter for this TV channel on the external receiver.

Please observe that in the case of modified TV channels, the transfer of GUIDE Plus+® channel data may take up to 24 hours.

The '*Setup*' screen



Setup your system to receive GUIDE Plus+ data.

Here you can make or change the basic settings such as language, country, external receiver. Moreover, you can watch an automatic demonstration of the GUIDE Plus+® system.

'*Setup*'

All the settings you have already made are displayed here. Select the desired line using ▼ or ▲ and confirm with **OK** . For more information on the settings, read section 'Setting up the GUIDE Plus+® system' in chapter 'The GUIDE Plus+® system'.

'*View Demo*'

Here you can view a demonstration of the different functions of the GUIDE Plus+® system.
Start the automatic presentation with **OK** .
If you start the demonstration, programmed recordings can be deleted.
If you cancel the presentation by pressing **OK** , you will go directly to the setup menu.

Information on the screen of your TV

You can check or change many of the functions and settings of your DVD recorder via the system menu bar.

Symbols in the menu bar

Press **DISC MENU** and then **SYSTEM MENU** to open the menu bar. If a disc is played back, you can open the menubar with **SYSTEM MENU** .
Use ◀ and ▶ to select the relevant function.
Use ▼ to confirm the function and go either to another menu or execute the function directly.
Some functions may not be available, depending on the disc inserted.

Menu bar 1

User preferences

Title/track

Chapter/index

Audio language

Subtitle language

Camera angle

Zoom

Menu bar 2

While menu bar 1 is being displayed you can go to menu bar 2 by pressing ▶ again.

Sound

Frame advance

Slow motion

Fast motion

Search by time

Field for temporary messages

The top left corner of the menu line contains a field for temporary messages relating to the various operating modes. This information appears briefly on the screen when certain disc functions have been activated:

Shuffle

Scan

Repeat entire disc

Repeat title

Repeat track

Repeat chapter

Repeat from A to the end

Repeat from A to B

Camera angle

Child lock enabled

Resume playback

Illegal action

Status field

During playback of a disc, the status field shows the current operating mode (status) of the DVD recorder and the type of disc inserted. This display can be switched off.

Disc type symbols

DVD+RW

DVD+R

DVD-Video

Video-CD

No disc

Error

Operating mode symbols

Recording

Stop

Playback

Playback-Pause

Record-Pause

Search forwards (8x speed)

Search backwards (8x speed)

Slow motion

Recording on the HDD

General

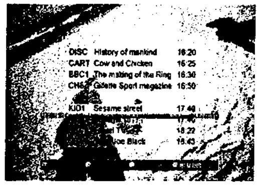
As soon as you turn on the DVD recorder, the currently selected TV channel is recorded in a temporary storage (Time shift Buffer).

Recordings in the time shift buffer will be automatically deleted e.g. after 3 hours if the period of the time shift buffer is set to 3 hours (factory setting). Only recordings marked in the Time shift Buffer will be stored on the the built-in HDD
For more information, read the next section 'The Time Shift Buffer'.

The following additional information is stored with each recording:
•) name of the recording
If no name is recognised from the GUIDE Plus+® systems data, only the programme number (programme name) and the time will be stored as the name.
•) length of the recording
•) recording mode (quality)
•) date of the recording
•) index picture of the recording

To facilitate the search of a specific position, a chapter marker is recorded every 5 minutes. How you switch off this function you will read in chapter 'User preferences for the HDD' in the section '***Preferences***', '***Recording***', '***Chapters***'. After the recording is completed, you can select these markers with ⏮ , ⏭ . Please make sure that the chapter selection is activated (the '***CHAPTER***' symbol lights up in the info bar at the top of the screen). If necessary, you can activate it using **T/C** .

The Time shift Buffer



DISC History of mankind 16:20
CART Cow and Chicken 16:25
BBC1 The making of the Ring 16:30
CH5 Gillette Sport magazine 16:50
KID1 Sesame street 17:40

As a result of the high data transfer speed of the HDD, it is possible to play back recordings from the time shift buffer while the recording is still in process.

Therefore, you can jump back to the currently selected TV programme using **JUMP BACK** and watch a scene again.

Moreover, you can use all playback features such as still picture, slow motion, search by time, search with ⏮ , ⏭ even with recordings that are still in the time shift buffer.
In the meantime, the recording continues.

If you change the TV channel (**CHANNEL +** , **CHANNEL −**) a new title is created with the new TV channel in the time shift buffer. If you watch a TV show only for a short time (less than 60 seconds) before you change to a different TV channel, no new title is created.

For easier navigation, you can change the time period of the time shift buffer from 1 to 6 hours. 1 hour means that a recording is available only for one hour before it is automatically deleted to make room for the current recording.

If the GUIDE Plus+® system delivers title information, the latter is also stored with the recording. When recording TV shows without GUIDE Plus+® information, only the date and the time of the recording are stored as title.

What is the advantage from 1 hour and 6 hours?

The complete time periode of the time will be displayed on the whole screen of your TV.
With 1 hour you will get the highest comfort for searching a specific scene.
With 6 hours you will get the highest possible recording time.

Please observe that the Time shift Buffer needs also storage capacity on the HDD. Depending of the selected record mode (picture quality):
*6 hours in '**M1**' = approx. 28GB*
*6 hours in '**M8**' = approx. 3,4GB*
You can enter the time periode from 1 to 6 hours in the 'User preferences for the HDD'.

Symbols in the 'Time Shift Buffer'

Following symbols can appear in the info bar at the top of the screen in the 'Time Shift Buffer'. With the **INFO** button on the remote control you can also call up this infobar.

Left area

Information about the input signal were displayed here:
TUNER: Actual TV show (live picture) from the selected TV channel
P01: Programme/Channel number of the selected TV channel
ARD: Name of the TV-channel

Right area

Information about the current operating status were displayed here:
Clock Symbol: Actual (live) picture of the selected TV-channel (**TUNER** button)
PLAY: Playback from the HDD
PAUSE: Still picture
1/8, 1/4, 1/2: Slow motion forwards
-1/8, -1/4, -1/2: Slow motion backwards
4X, 8X, 16X, 32X: Fast motion forwards
-4X, -8X, -16X, -32X: Fast motion backwards

Navigation in the time shift buffer

Preparation:
•) The TV set is switched on, and, if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched to tuner mode (button **TUNER**).

① Press **INFO** to display the bar of the time shift buffer on the screen.

② The following buttons are available:

- **⏮ , ⏭ , PLAY ▶ , PAUSE II , ◀ , ▶ , JUMP FWD , JUMP BACK** for navigation in the time bar.

- **T/C**
  Switching between title/chapter for selection using ⏮ , ⏭ . The top screen line displays either '***TITLE***' for selecting titles or '***CHAPTER***' for selecting chapters

- **REC/OTR ●** :
  - To start a recording that will be stored on the HDD.
  - To mark a title that will be stored on the HDD.
  - Hold button down to separate the beginning of a title.

- **Red function button:**
  - To cancel the marked recording that was set with the **REC/OTR ●** button.
  - Hold button down to separate the end of a title.

- **Yellow function button: ('*OVERVIEW*')**
  To display an overview of all content of the time shift buffer.

- **Blue function button:('*MORE INFO*'):**
  To display any additional information for the actual TV show transmitted by the GUIDE Plus+® system.

Mark TV shows for recording

As a rule, recordings in the time shift butter are automatically deleted after a certain time (1 to 6 hours). In order to store recordings on the HDD permanently, you can mark sections of the time shift buffer that will not be deleted and will be available as titles for later playback.

Mark an entire title

A title marker is set if you are watching a TV show longer than 60 seconds. (No change of programme number within 60 seconds)
If you want to mark an entire title (title marker at the beginning and at the end), proceed as follows:

① Press **INFO** to display the bar of the time shift buffer on the screen.

- You can also press the yellow colour button to get a better overview of the recordings.

② Select the title you want to store with ▼ , ▲ .

③ Press **REC/OTR ●** to mark the title.
→ The colour within the bar changes to red. If you press the yellow button, you will see programmes marked for recording with a red dot.

- To remove the marker, press the red function button. The red title marker disappears.

④ If you want to mark other titles, repeat steps ② and ③ , until you have selected all the titles you want.

- If you want to mark several titles in a sequence, go to the oldest title and press **REC/OTR ●** several times.

- Using **REC/OTR ●** you can also mark the future end of a title. You will see this in the red marked '**IIIIIIIIIIIII**' symbol on the right end of the Time Shift Buffer bar.
  The recording will be stoped automatically at the end of the program.
  If the start (titlemarker) of the TV-Show was not taken from the GUIDE Plus+® System, or no GUIDE Plus+® is available, you can extend the end by +30, +60, +90 ,... minutes

Mark part of a title

You can also mark only parts of a title.
If you mark several parts of a title, each part will be stored as a separate title on the HDD.

① Press **INFO** to display the bar of the time shift buffer on the screen.

- You can also press the yellow colour button to get a better overview of the recordings.

② Select the title you want to store with ▼ , ▲ .

③ The following options are available:

- **Freely selectable end:**
  - Press **REC/OTR ●** to select the entire title. The colour changes to red.
  - Search for the desired end using ◀ , ▶ .
  - Hold down the red button:
    Red marked recording changes to its original colour from the current position to the end of the title.

    If you want to set more markers in one title, start marking at the begin of the title.

- **Freely selectable beginning:**
  - Search for the desired beginning using ◀ , ▶ .
  - Hold down the **REC/OTR ●** button.
    The marker changes to red from the current position to the end of the title.

- **Freely selectable beginning and end:**
  First, you must define the beginning and then cut off the end.
  - Search for the desired beginning using ◀ , ▶ .
  - Hold down the **REC/OTR ●** button.
    The marker changes to red from the current position to the end of the title.
  - Search for the desired end using ◀ , ▶ .
  - Hold down the red button:
    Red marker changes to its original colour from the current position to the end of the title.

How can I delete the changes?
Press **REC/OTR ●** *to mark the entire title.*
To remove the marker, press the red function button.

'Auto delete'

If there is no space for new recordings on the HDD, recordings will be automatically deleted in the following order:
1) Titles that have already been viewed. Symbol '***Symb seen***'.
2) Titles that were not protected. No symbol '***Symb protect***' available.

More information you will find in the chapter 'User preferences for the HDD'.

Manual recordings

Recordings are always started and stored in the time shift buffer as soon as you switch on the device.

- You can mark a recording for storage on the HDD using **REC/OTR ●** on the remote control or ● on the device. Such marked recordings are displayed as a red bar in the time shift buffer and are not automatically deleted after the time shift buffer period (1 to 6 hours) expires.

- If you switch off the DVD recorder with **STANDBY ⏻** or select the '***Flush Buffer***' function, all other recordings of the time shift buffer will be deleted.

If you press the red function button, the marker for the recording is removed.

OTR recordings

Recordings made using **REC/OTR ●** will be automatically stopped after the end of the TV show if information is available from the GUIDE Plus+® system. If no information is available, you can select the time after which a recording will automatically stop using **REC/OTR ●** . (each time you press the button, you prolong the switch-off time by 30 minutes)

If you press the red function button, the marker for the recording is removed.

Direct Record

If the recording is manually started, the **switched off** DVD recorder receives the currently selected TV channel through the scart cable. The selected TV channel is compared with the stored TV channel of the DVD recorder. If the TV channel can be found, the DVD recorder selects it and starts the recording.
If no corresponding TV channel is found in the DVD recorder, an error message appears.
Read the next section 'Switching Direct Record on or off' on how to switch Direct Record on or off.

How does Direct Record work?
The DVD recorder compares the TV channel selected on the TV set with its stored TV channels via the scart cable. If the same TV channel is found, the DVD recorder switches to the corresponding programme number and starts recording.

Please do not change channel on the TV set during search. This may affect the tuning on the DVD recorder.

① Select the programme number on the TV set from which you want to make the recording.

② Press **REC/OTR ●** while the DVD recorder is **switched off** .
× **'WAIT' appears in the display**
✓ The DVD recorder compares its stored TV channels with those of the TV set. Please do not change channel on the TV set while 'WAIT' appears in the display.

× **'NOTV' appears on the display**

- ✓ This TV channel was not found in the memory of the DVD recorder. Check whether all TV channels stored in the TV set are available on the DVD recorder. If necessary, store the missing TV channels. Read section 'Manual TV channel search' in the chapter 'Installing your DVD recorder'.
- ✓ Check the connectors of the scart cable.
- ✓ Consult the instruction manual of your TV set to find out which scart socket sends out video signals.
- ✓ If all this is to no avail, you cannot use this function.

③ To stop the recording press and hold the red function button on the remote control until the red light around the ● button is switched off.

Switching 'Direct Record' on or off

① Press **BROWSER HDD** and then **SYSTEM MENU** button on the remote control.
→ The 'SYSTEM MENU' appears.

② Select '***Preferences***' with ▼ .

③ Press ▶ to select '***Recording***'.

④ Select '***Direct rec.***'(second menu page) using ▼ .

⑤ Select '***On***' using ▶ .

O To switch off the function, select '***Off*** using ▶ .

⑥ End with **SYSTEM MENU** .

Automatic recording from a satellite receiver (sat recording)

You can only use this function if you have a satellite receiver that can control other devices via a scart cable and a programming function (timer). For more information, consult the instruction manual of your satellite receiver.

① Switch on the TV set. If necessary, select the programme number for the DVD recorder.

② Press the **BROWSER HDD** and then the **SYSTEM MENU** button on the remote control.
→ The 'SYSTEM MENU' appears.

③ Select '***Preferences***' with ▼ .

④ Press ▶ to select '***Recording***'.

⑤ Select '***Sat record***' (second menu page) using ▼ .

⑥ Select '***On***' using ▶ .

O To switch off the function, select '***Off*** using ▶ .

⑦ To end, press **SYSTEM MENU** .

⑧ Connect the **EXT2 AUX-I/O** scart socket of the DVD recorder with the corresponding scart socket of the satellite receiver using a scart cable.

⑨ Program the satellite receiver with the desired data for recording (programme number of the TV channel, start time and end time). If necessary, also consult the instruction manual of your satellite receiver.

⑩ Switch off the DVD recorder using **STANDBY** ⏻ .
→ In addition, 'SAT' will appear in the display to indicate that the function is activated.

⑪ If necessary switch the satellite receiver to standby. See the instruction manual for the satellite receiver for details.

The DVD recorder is now ready for recording.
→ The start and the end of the recording will be controlled via the **EXT2 AUX-I/O** scart socket.

Recording from a video recorder/DVD player

Please observe:
Most pre-recorded video cassettes or DVDs are copy-protected. If you try to copy these, the message 'COPY PROT' will appear in the display of the DVD recorder.

Preparation:
•) Switch on the TV set and, if necessary, select the programme number for the DVD recorder.
•)Switch on the DVD recorder.
•) Select recording mode (button **TUNER** , button **SYSTEM MENU** , '***Preferences***', button ▶ '***Record mode***').

① Connect the video recorder/DVD Player as described in the chapter 'Connecting additional devices'.

② Press **TUNER** to display the picture of the Video recorder/DVD player on the screen.

③ Use ▼ , ▲ to select the programme number of the input socket to which the Video recorder/DVD player is connected. ('***E1***' for **EXT1 TO TV-I/O** , '***E2***' for **EXT2 AUX-I/O**)

Please observe that for recordings via the front sockets **S-VIDEO (CAM1) / VIDEO (CAM1)** /'***CAM1***' or **DV IN (CAM2)** / '***CAM2***' the recording mode must be selected under '***Camera mode***' in '***Preferences***' of the system menu.

④ Switch on the video recorder/DVD player.

O In case playback has started automatically, interrupt it with **STOP ■** or **PAUSE II** .

⑤ Start recording by pressing **REC/OTR ●** on the DVD recorder and playback by pressing **PLAY ▶** on the video recorder/DVD player.

× **When copying video cassettes, 'NO SIGNAL' appears in the display of the DVD recorder**

- ✓ Check whether the cable connectors are properly inserted.
- ✓ If the recording is made from a video recorder, change the 'tracking' setting on the video recorder.
- ✓ In case of bad or non-standard video input signals, the DVD recorder may be unable to detect the signal.

× **When copying DVD video discs or pre-recorded video cassettes, the picture is fuzzy and brightness varies**

- ✓ This happens when you try to copy DVDs or video cassettes that are copy-protected. Although the complete cassette/disc is recorded, only parts without copy protected signal can be played back. This interference is unavoidable with copy-protected DVDs or video cassettes.

⑥ To stop the recording press and hold the red function button on the remote control until the red light around the ● button is switched off.

Recording from a camera connected to the front sockets

Using this function, you can store recordings via the front sockets directly on the HDD. These titles will be automatically protected to prevent them from being automatically deleted in case the HDD is full.

Please observe the following:
•) Any programmed recordings (TIMER) will not be carried out during this operating mode.
•) If there are any recordings in the time shift buffer, they will be deleted. Therefore, store important recordings on the HDD (**REC/OTR ●**). For more information on the time shift buffer, read the chapter 'The Time Shift Buffer'.

① Connect the camera as described in the chapter ' Connecting additonal devices/Connect camcorder to the front sockets'

② Press **CAM** on the remote control.
→ The DVD recorder will switch to camera mode.

③ Select the socket to which the camera is connected using **CAM** .

O '***CAM1***'
For recordings from the **VIDEO (CAM1)** , **S-VIDEO (CAM1)** sockets.
Switching between the two sockets is done automatically. If a signal is available at both sockets at the same time, the signal at the **S-VIDEO (CAM1)** socket has priority. If you change socket (unplug), you must re-select the socket using **CAM** (press twice).

O '***CAM2***'
For recordings from the **DV IN (CAM2)** socket.

④ Press **REC/OTR ●** to start the recording.
→ If no signal is available, no recording will be made or the recording in progress will be stopped.

→ During the playback of a recorded 'copy protected' signal you will see only that parts of the recording where no copy protection can be recognised.

⑤ You can stop the recording using the following buttons:

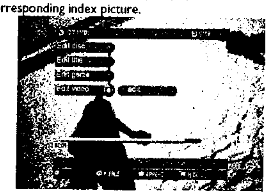
O **PAUSE II**
The recording will be paused. If you press the button again, the recording will resume.
A new chapter is created.

O **STOP ■**
The recording will be interrupted. You can start a new recording by pressing **REC/OTR ●** .
A new title is created.

⑥ Press the red function button to terminate the camera operating mode.
→ The recording will be stored on the HDD as a new title.

General

Each recording stored on the HDD is displayed in the media browser with a corresponding index picture.



❶ Press **BROWSER HDD** on the remote control or **HDD** on the DVD recorder.
→ The Media Browser appears.

❷ Select the title you want using ▼ , ▲ on the remote control or **DOWN** , **UP** on the device.

❸ You can choose one of the following options to start playback:

O **OK**
Playback always starts at the beginning of the selected title.

O **PLAY ►**
Playback will start at the position where it was interrupted in the selected title(**STOP ■**). This also works if other titles or DVDs have been played in the meantime.

❹ You can use the following buttons during playback:

O **I◄◄ , ►►I**
Briefly press: If chapter markers are available, start of current chapter, previous chapter (press twice), next chapter
Hold down: during pause: Slow motion
during playback: Qquick motion.

O **JUMP FWD** , **JUMP BACK**
Jump back or forward by a fixed time period.
Read section 'Set up/Jump forward, Jump back' in chapter 'User preferences for the HDD' on how to set up this time period.

O **INFO**
Display/Hide navigation bar with additional information.

O **PAUSE II**
Still picture. Go forwards or backwards one frame at a time using ► , ◄ .

❺ Press **STOP ■** to end playback.
→ You will return to the media browser.

The position where playback was interrupted will be automatically stored. By pressing **PLAY ►** , playback resumes at this position.

Additional playback features

Search by time

During playback of a title from the HDD or recordings in the time shift buffer, you can search for positions by directly entering the time:

❶ Press **SYSTEM MENU** during playback of a title.
→ The system menu appears.

❷ Press ► in line '***Toolbar***' to select '***Options***'.

❸ Press ▼ to select '***Time search***' and confirm with ► .

× **It is not possible to select '*Time search*'.**
✓ A title of the time shift buffer is played back that has no end yet (no programme change, or TV show is not over yet).

→ The time of the current playback position is displayed.

❹ Use the number buttons **0..9** of the remote control to enter the time where you want playback to start.

❺ Confirm with **OK** .
→ Playback starts at the desired position.

Repeat

You can choose a certain position of the title or the entire title for repeated playback.

❶ Press **BROWSER HDD** and choose the desired title with ▼ , ▲ .

❷ Press **OK** to start playback.

O **Repeat entire title**
Press the green function button.

Zoom feature

The Zoom feature allows you to enlarge the video image and pan through the enlarged image during play back from the HDD or from the time shift buffer.

❶ During playback, press **PAUSE II** at the position where you want to enlarge the picture.
→ You will see a still picture.

Press **SYSTEM MENU** .
→ The 'System Menu' appears.

❷ Press ► in line '***Toolbar***' to select '***Options***'.

❸ Press ▼ to select '***Zoom***' and confirm with ► .
→ On the screen arrows appears to indicate the directions. If neccessary switch on the info bar with **INFO** .

❹ Select with ▼ , ► , ▲ , ▼ the area you want to enlarge.

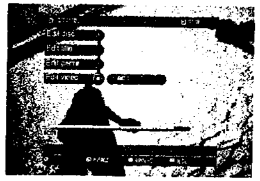
O **zoom in**
blue function button

O **zoom out**
yellow function button

O You can also pan in the enlarged picture using ▼ , ▲ , ◄ , ► .

❺ End with the red function button.
→ Play back starts automatically

The media browser



Each recording stored on the HDD is displayed in the media browser with an index picture. A actual recording of a TV show in the time shift buffer is also displayed here.
Please observe that title/chapter editing is only possible to a certain degree with such recordings.

Title editing includes:
- change
- delete
- archive
- lock (child lock)
- protect (against automatic deletion)

Titles in the Time shift Buffer marked for storage on the HDD, can only be locked or deleted.

Symbols in the 'Media Browser'

If you call up the Media Browser with the **BROWSER HDD** button, following symbols can appear in the infobar at the top of the screen:

Virtual title
This title was marked in the Time Shift Buffer for the storage on the HDD. This title can only be deleted or locked (child lock)

'***Symb seen***'
This title has been played once (has been 'watched'). If there is no storage capacity free on the HDD such 'watched' titles will be deleted automatically. You can change these setting in the title edit menu (**EDIT** button, blue button, **EDIT** button)
Titles that were not played back, will have no symbol.

'***Symb protect***'
The title is protected against editing and deleting. If the title is not protected, no symbol will be shown.

'***Symb lock***'
Child lock is activated. The index picture is switched off. Playback starts only if the right PIN code was entered. By default '0000' is defined as the PIN code. In the section 'Changing the PIN code' in chapter 'Access control (Child Lock)' you will find how you can change this code.

'***Symb archive***'
The marked titles will be stored (archived) on a DVD+RW/+R.

Change order for the media browser

Your may choose only titles that meet certain criteria for the overview.
This order will remain until you exit the media browser.
This order will also be considered when archiving titles on a DVD+RW/+R.

❶ Press **BROWSER HDD** on the remote control.
→ The Media Browser appears.

❷ Press ◄ .
→ The 'Order Menu' appears.

❸ Select one of the following options using ▼ or ▲ and confirm with **OK** .

O '***Alphabetical***':
Alphabetic order

O '***Recording Date***':
Sorting according to the date of the recording

O '***Delete Order***':
Sorting according to the order of the automatic deletion. If there is too less space for new recordings on the HDD , this order shows which recordings will be automatically deleted first.

O '***Protected***':
Order according to the recordings protected against deletion.

O '***Last Played***':
Sorting according to the titles last viewed.

Depending on the selected order, it may not be possible to select some titles.

Change title settings

Use this function to change the title settings.

① Press **BROWSER HDD** on the remote control.
→ The Media Browser appears.

② Select the title you want to change with ▼ , ▲ .

③ Choose one of the following functions with the colour buttons of your remote control:

- **Delete title**:
  red function button
  The tiltle (recordings) will be erased from the HDD.

- **Archive title**:
  green function button
  The title will be transferred to DVD+RW/+R. If it is not possible to record on a DVD+RW/+R, an error message appears (disc not inserted,...).
  If you want to archive several titles, mark the desired titles with **SELECT** . You can unmark the title using the same button.

- **Lock title (child lock)**:
  yellow function button
  You must enter a PIN code for playback. Read chapter 'Access control (child lock)' on how to enter or change the PIN code.

- **Protect title against editing, automatic deletion**:
  blue function button
  An error message will appear if you try to edit this title. Automatically deletion will take place, if your HDD will run full with recordings. Stored recordings will be deleted in a certain order. See details in the section 'Symbols in the media browser'

Edit title

Use this function to adapt the title (recording) to your personal preferences.

① Press **BROWSER HDD** on the remote control.
→ The Media Browser appears.

② Select the title whose settings you want to change with ▼ , ▲ .
Press **EDIT** .

③ Select one of the displayed functions with ▼ , ▲ and confirm with ▶ to proceed with the changes.

Depending on the selected function, you can choose different functions using the colour buttons on the remote control. The function of the button may vary. Therefore, read the function in the help line before pressing the button.

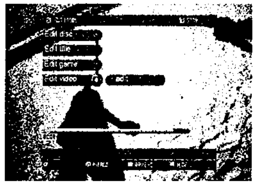
- *'Title name'*
  Change the name of the title.

- *'Clear chapters'*
  All chapter markers within the selected title will be deleted.

- *'Video edit'*
  Please read in the next chapter which modifications were possible.

'Video edit'

Here you can insert/clear chapter markers, hide chapters, merge chapters, or divide the title.



① Press **BROWSER HDD** on the remote control.
→ The Media Browser appears.

② Select the title whose settings you want to change with ▼ , ▲ .
Press **EDIT** .

③ Select *'Video edit'* and confirm with ▶ .
→ Playback starts automatically.

④ Search the position where you want to make changes with ◀ , ▶ , ⏮ , ⏭ .

You can expand the timebar of a title over the whole TV-screen using ▲ .

⑤ Press **PAUSE II** :

- You can insert or remove chapter markers to find a scene easily with the **OK** button.

⑥ Choose one of the following functions with the colour buttons of your remote control:

- *'DIVIDE'*(red function button):
  You can divide a title in as many parts as you like.

- *'MERGE'*(green function button):
  You can merge the current chapter with the previous chapter. (The previous chapter marker will be deleted). Please observe that you cannot use this function with titles.

- *'KEYFRAME'*(yellow function button):
  To select an index picture that designates this title in the media browser.
  You can select this function only during still (button **PAUSE II**).

- *'HIDE'*(blue function button):
  You can hide or unhide certain chapters during playback (e.g. commercials).

Editing recorded titles (name)

From the GUIDE Plus+® data the title (name) of a TV show will be taken automatically (e.g. 'ROCKY'). Otherwise, only the programme number (programme name) and the time will be stored as the name of the recording. The name of the recording can only be changed after the recording has finished.

① If necessary, press **STOP ■** to stop playback.

② Press **BROWSER HDD** on the remote control.
→ The Media Browser appears.

③ Use ▲ or ▼ to select the title whose title you want to edit.

④ Press **EDIT** .
→ The title edit menu appears on the screen.

⑤ Select the line *'Title name'* and confirm using ▶ .
→ The field for editing the title appears.

⑥ Use ▶ or ◀ to select the position where the letter/number/icon is to be changed or re-entered.

⑦ Change the icon using ▲ or ▼ .

- You can switch between upper and lowercase using **SELECT** .

- You can clear all characters using the red function button (*'CLEAR'*).

- You can stop editing without storing the change by pressing the green function button(*'CANCEL'*).

Enter characters using 0..9

Keep pressing the number button until the desired character or number is displayed. You can select language-dependent special characters at the corresponding letter using ⏮ *or* ⏭ *e.g.: ä, press* **2** *for a and keep pressing* ⏭ *until ä appears.*
For special characters, press **1** *several times.*
The position for the following character is selected automatically.
Press **1** *to insert an empty space.*
Press **SELECT** *to switch to upper case.*

⑧ Repeat ④ and ⑤ until you have made the changes you want.

⑨ Save the new name with **OK** .

⑩ To end, press **EDIT** .

Playback from a disc

- ✗ **I can see the message 'EMPTYDISC'**
- ✓ The disc does not contain any recordings.

④ To stop playback, press **STOP ■** on the remote control or ■ on the DVD recorder.

⑤ To remove the disc, press **OPEN/CLOSE ▲** on the front of the DVD recorder.

Playing an audio CD

You can also use the DVD recorder to play audio CDs

If the TV is on, the audio CD screen appears automatically.
During playback, the current track number and its elapsed playing time will show on the TV screen and on the recorder display.

① Insert an audio CD.
→ Playback starts automatically.

② Stop playback using **STOP ■** .
→ The number of tracks and the total time are displayed.

Playing an MP3 CD

MP3 (MPEG1 Audio Layer-3) files are highly compressed music files. Using this technology the data volume can be compressed by a factor of 10. This means it is possible to record 10 hours of music in CD quality on a single CD-ROM.

When creating MP3 CDs please note the following:
File system: ISO9660
Directory structure: maximum of 8 levels
Formats: *.mp3
Filenames: maximum of 12 characters (8+3)
Maximum of 32 albums, 999 titles
Supported sampling frequencies: 32, 44.1, 48 (kHz). Music with sampling frequencies other than these will be skipped.
Supported bit rates: 32, 64, 96, 128, 192, 256 (kbit/s)
ID3 Tag: Version 1, 1.1. In later versions the directory name is displayed as the album and the filename as the title.

Important notes for playback:
Only the first session of a multi-session CD will play back.

① Insert an MP3 CD.
→ Playback starts automatically.

MP3 CD display
If the TV is on, the MP3 CD screen appears automatically.

During playback, the current track number and its elapsed playing time will show on the TV screen and on the recorder display.
During stopped playback (**STOP ■** *button) the numbers of the albums will show on the TV screen and on the display.*

Further information on the album, track and artist will also be displayed if included in the ID tag.

② Stop playback using **STOP ■** .
→ The number of albums is displayed in the display.

- ○ Using ⏮ or ⏭ select the next or previous title.
- ○ You can also use the **T/C** button to select titles and albums.
  - Press the **T/C** button and use the ▶ or ◀ button to select the 'T' symbol for title or 'C' for chapter. Use the ▼ or ▲ buttons or the number buttons **0..9** on the remote control to select the number of the title/chapter.
- ○ You can also use the repeat functions (**SELECT** button).

Playing a (Super) Video CD

(Super) Video CDs may be equipped with PBC (Play Back Control). This means that special playback functions (menus) can be directly selected. The video CD must be PBC compatible (see CD case). 'PBC' is active in the default settings.

① Insert a (Super) Video CD.

→ If the ■' symbol appears in the display, start playback by pressing **PLAY ▶** .

- ○ If a menu appears on the screen, use the remote control buttons indicated on the screen to select the menu option you want (PREV= ⏮ , NEXT= ⏭) or with the number buttons **0..9** .
- ○ If a PBC menu consists of a list of titles, you can select a title directly.
- ○ Use **RETURN** to go back to the previous menu

② Stop playback using **STOP ■** .

Additonal playback features

DVD's were divided in titles and chapters.

- ○ During playback, press ⏭ to go to the next title. If there are several chapters within a title the next chapter.
- ○ Press ⏮ to return to the start of the current title/chapter.
- ○ Press ⏮ twice to return to the start of the previous title/chapter.

Use the T/C (title/chapter) button
- Press **T/C** *(title/chapter) and then use ▲ or ▼ to select the appropriate title.*
Make sure the symbol 'T' (title) is selected in the menu bar.
- Use **T/C** *to select chapters within a title. Press* **T/C** *and use ▶ to select the 'C' symbol (chapter).*
Now select the appropriate chapter with ▲ or ▼.

Searching a disc

You can search the disc for a recording at 4x, 8x or 32x playback speed. Other speeds can only be selected via the menu bar (▶▶').

① During playback, press and hold ⏮ (reverse) or ⏭ (forwards) to switch to the search feature.

- ○ You can switch between the playback speeds using ⏮ / ⏭ .

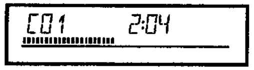
② To continue playback, press **PLAY ▶** at your chosen location.

- ✗ **No sound**
- ✓ The sound is switched off in search mode. This is not a fault in your machine.

Search feature via menu bar
- During playback press **SYSTEM MENU** *on the remote control. The menu bar will appear at the top of the screen.*
- Select the ▶▶' symbol using ▶ or ◀ and confirm with ▼.
- You can now use the ◀ or ▶ button to select different forward and backward search speeds.
- If necessary, switch the menu bar off with the **SYSTEM MENU** *button.*
- To continue playback, press **PLAY ▶** .

Still picture

① During playback, press **PAUSE II** to stop playback and display a still picture.



Frame advance via menu bar
- During a still picture press **SYSTEM MENU** *on the remote control. The menu bar will appear at the top of the screen.*
- Select the '◀▯▶' symbol using ▶ or ◀ and confirm with ▼.
- You can now use the ◀ or ▶ button to go forwards or backwards one frame at a time.
- If necessary, switch the menu bar off with the **SYSTEM MENU** *button.*

② To continue playback, press **PLAY ▶** .

Slow motion

① During playback press **PAUSE II** on the remote control. Now hold down ⏮ or ⏭ to switch to slow motion.

- ○ You can switch between different speeds using ⏮ or ⏭ .

Slow motion via menu bar
- During playback press **PAUSE II** *and then* **SYSTEM MENU** *on the remote control. The menu bar will appear at the top of the screen.*
- Select the ▷' symbol using ▶ or ◀ and confirm with ▼.
- You can now use the ◀ or ▶ button to select different forward and backward slow motion speeds.
- If necessary, switch the menu bar off with the **SYSTEM MENU** *button.*

② To continue playback, press **PLAY ▶** twice.

Search by time

Using this feature you can select where playback should start (select elapsed time).

① During playback press **SYSTEM MENU** on the remote control.
→ The menu bar will appear at the top of the screen.

② Select the '⏲' symbol using ▶ or ◀ and confirm with ▼ .
→ Playback is stopped and a box appears on the screen showing the elapsed time

③ Enter the start time with the digit keys **0..9** from where playback should start.

④ Confirm with **OK** .

- ✗ **The time entered will flash on the screen**
- ✓ The selected title is shorter than the time entered. Enter a new time or cancel the function by pressing **SYSTEM MENU** .

⑤ Playback starts at the time you entered.

Repeat/Shuffle play

You can mark entire sections or the whole disc for endless playback. Depending on the type of disc (DVD video, DVD+RW, video CD) you can select a chapter, title or the entire disc.

① Select the desired chapter, title or the entire disc and start playback.

② During playback, press **SELECT** . By pressing **SELECT** again you can chose from the following options:
•) ' chapter ': repeat chapter (DVD only)
•) ' title ': repeat track/title
•) ' repeat ': repeat entire disc (Video CD, Audio CD only)
•) ' shuffle ': Shuffle
•) Display disappears: no repeat

③ To end the repeat, press the **STOP ■** button.

O You can also keep pressing the **SELECT** button until the displays disappear.

Repeating a passage (A-B)

You can repeat a particular passage within a title/chapter. You need to indicate the start and end of the passage.

① During playback press **PAUSE II** at the start point.
→ You will see a still picture.

② Keep pressing **SELECT** until ' A ' appears on the screen.
→ The start point is now saved.

③

Press **PLAY ▶** to start playback.

④ When the end point is reached press **OK** .
→ ' A-B ' appears on the TV screen.
Playback now takes place within these points.

⑤ To end the repeat, press the **STOP ■** button.

O You can also keep pressing the **SELECT** button until the displays disappear.

Scan feature

This feature plays back the first 10 seconds of each chapter (DVD) or track (CD).

① During playback, press **SELECT** . Select ' scan ' using **SELECT** .
→ After 10 seconds the DVD recorder switches to the next chapter/index.

O To start playback at the relevant chapter/Index press **STOP ■** and then **PLAY ▶** .

Camera angle

If a DVD contains scenes that have been shot from different camera angles you can select these camera angles for playback.

① During playback, press **PAUSE II** .
→ You will see a still picture.

② Press **SYSTEM MENU** and select the '🎥' icon using ▶ .

× **The '🎥' symbol will be hidden**
✓ The selected scene has been shot from only one camera angle. This feature is therefore not available. For more information please read the cover of your DVD disc.

③ Select the required camera angle with ▼ or ▲ .

O You can also directly enter the number with the number buttons **0..9** .

→ After a short time, playback will resume from the new camera angle.
The '🎥' symbol will remain visible until a scene starts for which there is only one camera angle.

Zoom feature

The Zoom feature allows you to enlarge the video image and pan through the enlarged image.

① During playback, press **PAUSE II** .
→ The DVD recorder switches to 'PAUSE'. You will see a still picture.

② Press **SYSTEM MENU** and select the '🔍' icon using ▶ .

③ Select the required zoom factor using ▼ or ▲ .
→ When '***press OK to pan***' appears on the screen, the zoom process is complete.

④ Press **OK** . Using ▲ , ▼ , ▶ , ◀ select the part of the image you wish to view.

⑤ Confirm with **OK** .

⑥ To stop the feature, press **PLAY ▶** and then **SYSTEM MENU** .

Select the audio language

Many pre-recorded DVD discs have more than one audio language. The language initially selected for playback will be the one you selected when you first set up the DVD recorder. However you can change the audio language of the inserted disc at any time.
You can change the audio language either using the menu of the inserted disc (**DISC MENU** button) or the DVD recorder's menu bar (**SYSTEM MENU** button). The audio languages for DVD playback in the two menus may be different. Please note that with some DVDs the audio language and/or subtitle language can be changed only via the DVD menu.

① During playback press **SYSTEM MENU** and select the '🔊' icon using ▶ .

② Select the required audio language using ▼ or ▲ .

O You can also enter the number directly using the number buttons **0..9** .

→ Play continues in the new audio language.

Subtitles

Many pre-recorded DVD discs have more than one subtitle language. The language initially selected for playback will be the one you selected when you first set up the DVD recorder. However you can change the subtitle language of the inserted disc at any time.
You can change the subtitle language either using the menu of the inserted disc (**DISC MENU** button) or the menu bar (**SYSTEM MENU** button). The subtitle languages in the menus may differ.

① During playback press **SYSTEM MENU** and select the '▭' icon using ▶ .

② Select the required subtitle language using ▼ or ▲ .

O You can also enter the number directly using the number buttons **0..9** .

O You can switch off subtitles again with **0** or by pressing '***off***'.

→ Playback continues in the new subtitle language.

General information

The 'Disc Manager' is an integrated database in the DVD recorder that remembers all recordings made by this DVD recorder. This gives you a complete overview of your entire video collection at the touch of a button. The Disc Manager gives you quick and easy access to every recording **made with this DVD recorder**. The Disc Manager also tells you which film was recorded on which disc and how many unrecorded minutes remain on the discs.
And: You can go automatically to the beginning of the selected recording and start playback.

How many discs can I save in the Disc Manager?

You can store up to 999 discs on this DVD recorder. The maximum number of titles is more than 9,000. The maximum number of titles per disc is 49.

Caution when recording with other DVD recorders

Don't use a disc stored in the Disc Manager for recording on other DVD recorders. If you use a disc to record on another DVD recorder, then this disc will no longer be recognised by the Disc Manager. In this case, delete the disc from the Disc Manager's memory and then add it after it has been recorded.

Adding 'child-proof discs'

If you want to add child-proof discs you need to enter the PIN code.

Adding a disc to the Disc Manager

You can only add DVD+RW or DVD+R discs to the Disc Manager since other discs do not hold any information on the titles or lengths of the recordings. These discs have to be at least once recorded in the DVD-Recorder. A table of content have to be available.
DVD+R discs can also be finalised. Other discs cannot be added to the Disc Manager.

Recordings are saved automatically

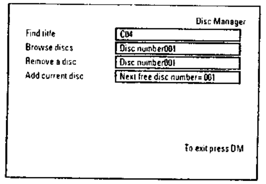
On a disc that has been added to the Disc Manager, you can make new recordings as often as you like using this DVD recorder. The titles of these recordings will be stored in the Disc Manager automatically.

Preparation:

•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.

•) the DVD recorder is switched on.

❶ Insert the DVD+RW/+R disc that you want to add in the DVD recorder.



Disc Manager
Find title — C04
Browse discs — Disc number001
Remove a disc — Disc number001
Add current disc — Next free disc number= 001
To exit press DM

× **When I insert a disc I see a number on the screen in the index picture screen in the top left-hand corner**

✓ You have inserted a disc that has already been registered by the Disc Manager.

❷ Press the **DISC MANAGER** button on the remote control.

❸ Select '***Add current disc***' using ▲ or ▼ and confirm with ▶ .

❹ Confirm with **OK** .

→ The disc number will be added to the Disc Manager.

→ The disc number is then displayed and the disc tray opens automatically.
The disc is now stored in the Disc Manager under the displayed disc number.
Please write this number on the disc and on the cover.

Why do I need to label the discs?

When searching for unrecorded free space or available recordings, you will asked to insert the appropriate discs (disc numbers).

❺ To end, press **DISC MANAGER** .

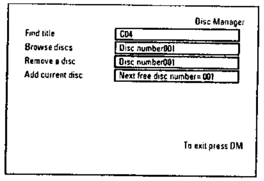
The DVD recorder will immediately recognise that this disc is saved in the Disc Manager. When this disc is inserted the disc number will appear in the title overview in the top left-hand corner.

Removing discs from the Disc Manager

Every DVD+RW/+R is stored with a number in the Disc Manager (DM). You can remove this disc number from the Disc Manager to use the Disc Manager's memory for new discs or to remove damaged discs from memory.

❶ Press **DISC MANAGER** on the remote control.

❷ Select '***Remove a disc***' using ▲ or ▼ and confirm with ▶ .



Disc Manager
Find title — C04
Browse discs — Disc number001
Remove a disc — Disc number001
Add current disc — Next free disc number= 001
To exit press DM

❸ Select the disc number with ▲ or ▼ and confirm with **OK** .

Disc contents are not deleted.

The disc is only removed from the Disc Manager's memory. Its contents remain unchanged.

❹ To end, press **DISC MANAGER** .

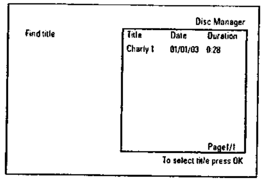
Searching for a title in the Disc Manager

This function can be used to quickly and easily find and play back a recording saved in the Disc Manager.

❶ Press **DISC MANAGER** on the remote control.

❷ Select '***Find title***' using ▼ or ▲ and confirm with ▶ .

→ A list of the titles of all recordings stored in the Disc Manager (DM) will appear on the TV screen.



Disc Manager
Find title

Title	Date	Duration
Charly 1	01/01/03	0:28

Page1/1
To select title press OK

What do the displays on the screen mean?

*'**Title**' = Title*
*'**Date**' = Date of the recording*
*'**Duration**' = Length of the recording*

❸ Select the title that you want to play back with ▼ or ▲ .

❹ Confirm with **OK** .

→ The DVD recorder will jump to the start of the selected recording.

× **I see the message '*Insert disc number*' on my screen**

✓ The selected recording is located on the Disc Manager disc with the displayed disc number. Please insert the appropriate disc. After a brief check, the DVD recorder will jump to the start of the selected recording.

Searching discs

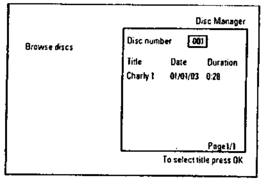
You can easily search for the title of a recording stored in the Disc Manager. To do this, the appropriate disc does not have to be in the DVD recorder.

❶ Press **DISC MANAGER** on the remote control.

❷ Select '***Browse discs***' using ▼ or ▲ .

❸ Confirm with ▶ .

→ The screen will show the contents of the last Disc Manager disc used.



Disc Manager
Browse discs
Disc number 001

Title	Date	Duration
Charly 1	01/01/03	0:28

Page1/1
To select title press OK

❹ Use ▲ or ▼ to select a different disc number if necessary and confirm with ▶ .

What do the displays on the screen mean?

*'**Title**' = Title*
*'**Date**' = Date of the recording*
*'**Duration**' = Length of the recording*

❺ Press ▲ or ▼ to select the desired title.

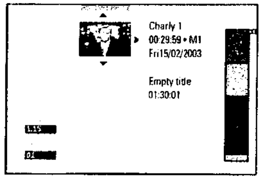
❻ Confirm with **OK** .

→ The DVD recorder searches for the start of the appropriate recording.

× **I see the message '*Insert disc number*' on my screen**

✓ The selected recording is located on the Disc Manager disc with the displayed disc number. Please insert the appropriate disc.

General


Charly 1
00:29:59 • M1
Fri15/02/2003

Empty title
01:30:01

General

When a recording is made to disc, the following additional information is also stored at the beginning of the recording:
•) Name of the recording
If a name has not been assigned to the TV channel, only the programme number and time are stored as the name
•) Length of the recording
•) Record type (Quality)
•) Date of the recording
•) Index picture of the recording

A marker will be set every 5-6 minutes if the '***Auto chapters***' function is activated in the '***Record settings***' menu. This marker is known as a 'chapter'.
These markers can be changed when the recording has finished.

> ***Can markers be set on a DVD+R disc?***
> *Markers can be set on these discs if they have not been finalised.*

It is also possible to add 'chapters' later. This means that scenes you do not want to see during playback, such as commercials, can be hidden or skipped. During playback you can watch your recording as a continuous sequence without the hidden chapters.

Favorite Scene Selection

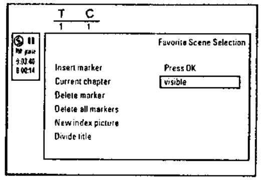
In this menu you can adapt a title to suit your particular needs.
You can insert/delete chapter markers, hide chapters, select a new index, or split up a title.

In this menu you can adapt a title on a DVD+RW/+R to suit your particular needs.
You can insert/delete chapter markers, delete all chapter markers, or split up the title. Press **EDIT** on the remote control during recording to open this menu.

Insert chapter markers

During recording, you can set or delete chapter markers within a title. The maximum number of chapters per disc is 255 and 99 per title. If one of these limits is reached the following message will appear on the screen: '***Chapter limit***'. You need to delete some markers before you can insert new ones or make recordings.

① During playback, press **EDIT** on the remote control at the appropriate point.
→ The '***Favorite Scene Selection***' menu appears on the TV screen.


T C
1 1
Favorite Scene Selection
Insert marker — Press OK
Current chapter — visible
Delete marker
Delete all markers
New index picture
Divide title

② Confirm '***Insert marker***' by pressing **OK**.
→ '***Inserting marker***' appears on the TV screen.

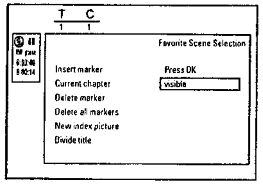
> ***'X' will appear on the screen:***
> *This DVD is write-protected or the disc is a finalised DVD-R. Subsequent changes cannot be made.*

③ To stop this function, press **EDIT**.

Hiding chapters

Initially, all the chapters are visible. You can hide chapters for playback (e.g. advertisements) or make them visible again. In editing mode, hidden chapters are shown darker.
A chapter always consists of a start marker and an end marker.
To hide a certain scene, proceed as follows:

① Search the beginning of the scene you want to hide. Press **PAUSE II**.


T C
1 1
Favorite Scene Selection
Insert marker — Press OK
Current chapter — visible
Delete marker
Delete all markers
New index picture
Divide title

② Press **EDIT** on the remote control to call the '***Favorite Scene Selection***' editing menu.

③ Set the start marker using **OK**.
→ The number of chapters ('C') in the menu line will increase by one.

④ Search for the end of the scene.

O You can also use **▶▶I** or **I◀◀** to search faster for the end of the scene.
Make sure that you do not jump into the next title (title number 'T' must not change).

O Only chapters within a title can be hidden.

⑤ Press **PAUSE II** at the corresponding position.

⑥ Set the end marker with **OK**. This will also be the start marker of the next chapter.
→ The number of chapters ('C') in the menu line increases by one.

> * **The number of chapters ('C') has increased by two or more numbers**
> ✓ This is the case when you want to hide a chapter that, due to automatic chapter numbering (if switched on), stretches over two or more chapters. In this case, you must delete the start of the automatically generated chapter:
> - Press **T/C** twice while the editing menu is displayed to change the chapter number.
> - Select the chapter between the new markers using ▼ or ▲. Press **PAUSE II**.
> - Select '***Delete marker***' with ▼ to delete the current chapter marker. Confirm with **OK**. The current chapter number decreases by one.

⑦ Press **T/C** twice to change the chapter number 'C'.

⑧ Select the previous chapter with ▼, since you are already in the next chapter (end of the chapter is also the beginning of the next chapter).

⑨ Wait until the chapter has been played and press **PAUSE II** to stop playback.

⑩ Select '***Current chapter***' using ▼ or ▲.

⑪ Using ▶ select '***hidden***'.
→ The picture is shown darker.

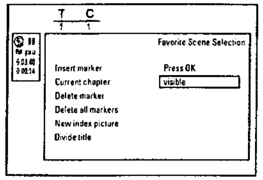
> ***Switching quickly***
> *You can switch between show chapters ('**visible**') and hide chapters ('**hidden**') quickly and easily using* **SELECT**.
> *This function is independent from the selected line.*

⑫ To end, press **EDIT**.

During playback this chapter will be skipped.
If the chapter is not visible, select '***visible***' in step ⑪ with ▶.

Deleting chapter markers

Within a title you can delete either all markers or individual markers.


T C
1 1
Favorite Scene Selection
Insert marker — Press OK
Current chapter — visible
Delete marker
Delete all markers
New index picture
Divide title

① While the relevant chapter is playing, press **EDIT** on the remote control.
→ The '***Favorite Scene Selection***' menu appears on the TV screen.

> ***How can I select different chapters?***
> - *Press the* **T/C** *button on the remote control. Titles and chapters are displayed at the top of the screen.*
> - *Select title (T) or chapter (C) with ▶ or ◀.*
> - *Use ▲ or ▼ to select the title/chapter channel you want to edit.*

② Use ▼ to select:

O line '***Delete marker***' for this chapter

O line '***Delete all markers***' for all chapters within the selected title.

③ Confirm with **OK**. (You will be prompted to press **OK** again to make sure you really want to delete all markers. If you do not want to, press the ◀ button.)

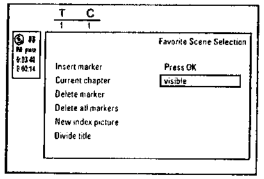
④ To end the menu, press **EDIT**.

Changing the index picture

Normally the picture from the beginning of a recording is used as the index picture. You can however choose any picture from the recording as the index picture.

① During playback, search for location of the new index picture. Press the **PAUSE II** button.

② Press the **EDIT** button.
→ The '***Favorite Scene Selection***' menu appears on the TV screen.


T C
1 1
Favorite Scene Selection
Insert marker
Press OK
Current chapter
visible
Delete marker
Delete all markers
New index picture
Divide title

❸ Select line '***New index picture***' and confirm with **OK** .

❹ Start the change with **OK** .
→ '***Updating menu***' appears on the TV screen.

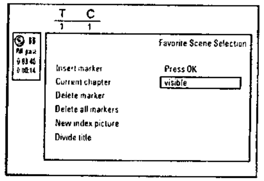
Once the revision has been completed successfully the DVD recorder reverts to the index overview.

Dividing titles

You can divide a title into several sections (titles) of any size. Each of these sections (titles) is identified by its own index.
Note: This division cannot be undone.

Can I divide titles on DVD+R discs?
As recordings on DVD+R discs cannot be overwritten, it is not possible to divide titles on DVD+R discs.

❶ While the relevant title is playing, press **EDIT** on the remote control.
→ The '***Favorite Scene Selection***' menu appears on the TV screen.


T C
1 1
Favorite Scene Selection
Insert marker
Press OK
Current chapter
visible
Delete marker
Delete all markers
New index picture
Divide title

❷ Select '***Divide title***' and confirm with the **OK** button.

❸ If you are sure, press **OK** to start the process.
→ '***Dividing title***' appears on the TV screen.

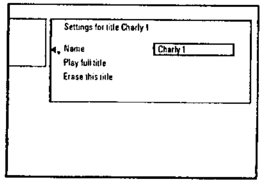
❹ Wait until the new title is displayed with an index picture in the index picture overview.

The process of splitting the title is now complete.

Editing recording titles (name)

❶ If required, press the **STOP ■** button to interrupt playback.

❷ Using ▲ or ▼ select the title whose name you want to edit and confirm with ▶ .
→ The menu for editing names appears.


Settings for title Charly 1
Name
Charly 1
Play full title
Erase this title

❸ Select '***Name***' using ▲ or ▼ and confirm with ▶ .

❹ Using ▶ or ◀ select the position where the letter/number/icon is to be changed/re-entered.

❺ Change the icon using ▲ or ▼ .

- You can switch between upper and lowercase using **SELECT** .
- You can delete the character using the red function button.

How can I enter the characters with the buttons 0..9 ?
Press a number button as often as the required character or the number appears. You can enter language dependent characters with the buttons ⏮ *or* ⏭ *on the corresponding character e.g.: ä, button* **2** *for 'a' and then with* ⏭ *as often as 'ä' appears.*
For special characters press the button **1** *repeatedly.*
The position for the following character will be selected automatically.
To enter a space press the button **1** *.*
To switch over to upper case characters press **SELECT** *.*

To erase a character press the red function button.

❻ Repeat ❹ and ❺ until you have made the changes you want.

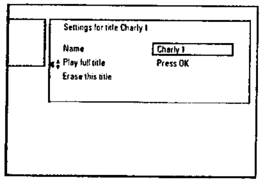
❼ Save the new name with **OK** .
→ '***Storing name***' appears on the TV screen for confirmation.

❽ To end, press ◀ .

Playing the entire title

If you have hidden certain sections (chapters) of a title, this setting lets you watch the entire title including the hidden sections. To do this, proceed as follows:

❶ Press the **STOP ■** button or during playback press **DISC MENU** .


Settings for title Charly 1
Name
Charly 1
Play full title
Press OK
Erase this title

❷ Using ▲ or ▼ select the title you want to play all of and confirm with ▶ .
→ The title editing menu will appear.

❸ Select '***Play full title***' using ▲ or ▼ and confirm with **OK** .

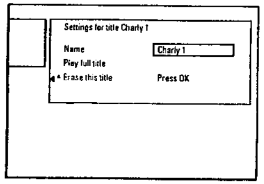
→ Playback starts automatically. The title is played in its entirety - including the hidden chapters.

Erasing recordings/titles

You can erase specific recordings from a disc.
Please note: If there is an '***Empty title***' between titles, this space can not be used from this DVD-Recorder.
Each recording from the HDD to a DVD+RW/+R (archiving) will be added at the end of existing recordings

❶ Press the **STOP ■** button or during playback press **DISC MENU** .

❷ Using ▲ or ▼ select the title you want to delete and confirm with ▶ .
→ The title editing menu will appear.


Settings for title Charly 1
Name
Charly 1
Play full title
Erase this title
Press OK

❸ Select '***Erase this title***' using ▲ or ▼ and confirm with **OK** .
→ '***This will completely erase this title***'. '***Press OK to confirm***' appears on the TV screen.

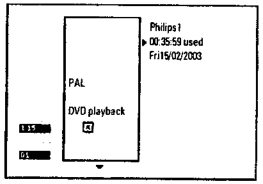
- If you want to delete this title, press **OK** to confirm.
- Otherwise press ◀ .

❹ '***Erasing title***' appears on the TV screen.

❺ At this point '***Empty title***' appears in the 'index picture display'. A new recording can now be made here.
If the deleted title was very short (less than 1 minute) '***Empty title***' will not appear at this point.

Can titles be deleted from a DVD+R disc?
Titles on DVD+R discs are only marked as deleted. '**Deleted title**' *will appear in the display instead of* '**Empty title**'. *During playback the 'deleted' title is skipped. The space used for this title cannot be used again as the title has not been physically deleted. Once the disc has been finalised no further changes can be made.*

Disc settings


Philips 1
00:35:59 used
Fri15/02/2003
PAL
DVD playback
1 15
01

This screen appears **before** the first title and contains general information about the current disc.

You can:
•) change the name of the disc
•) activate or deactivate write protection on the disc
•) Finish editing (make the disc DVD compatible)
•) finalise a DVD+R
•) delete a DVD+RW

To get to this display, proceed as follows:

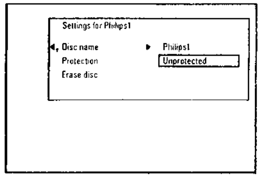
❶ Press the **STOP ■** button or during playback press **DISC MENU** .

❷ Select the first title with ▲ or press **STOP ■** . **STOP ■** .

❸ Press ▲ .
→ The disc info display will appear.

Changing the disc name

❶ In the 'Disc info display' press ▶ .
→ The '***Settings for***' menu appears on the TV screen.



Settings for Philips1
◀, Disc name ▶ Philips1
Protection Unprotected
Erase disc

❷ Select '***Disc name***' using ▲ or ▼ and confirm with ▶ .

❸ Using ▶ or ◀ select the position where the letter/number/icon is to be changed/re-entered.

❹ Change the icon using ▲ or ▼ .

- You can switch between upper and lowercase using **SELECT** .

- You can delete the character using the red function button.

❺ Repeat ❸ and ❹ until you have made the changes you want.

❻ Save the new title with **OK** .
→ '***Storing name***' appears on the TV screen for confirmation.

❼ To end, press ◀ .

Finishing editing

If one or more titles have been edited a DVD player may still display the original titles. You can prepare your DVD+RW disc in such a way that a DVD player will be able to play the edited version.

❶ In the 'Disc info display' press ▶ .
→ The '***Settings for***' menu appears on the TV screen.

❷ Select '***Make edits compatible***' using ▲ or ▼ and confirm with **OK** .

× ***'Make edits compatible'* does not appear**
✓ Your disc is already compatible. There is no need for conversion.
To end, press **SYSTEM MENU** ..

❸ The screen displays '***This will take***' to show how long the process will last.

❹ To confirm press **OK** .
→ '***Working***...' appears on the TV screen.

→ bar will move from left to right indicating progress.

Finalising DVD+R discs

This feature is required to play back a DVD+R disc in a DVD player. Once the disc has been finalised no further recordings or changes can be made.

❶ In the 'Disc info display' press ▶ .
→ The '***Settings for***' menu appears on the TV screen.

❷ Select '***Finalise disc***' using ▲ or ▼ and confirm with **OK** .

× ***'Finalise disc'* does not appear**
✓ Either there is no DVD+R disc inserted or the disc is already finalised.
To end, press **SYSTEM MENU** .

× **The *'Settings for'* menu does not appear**
✓ The menu may not appear if the disc has been recorded on another DVD recorder. In this case, use the '***Finalise disc***' feature in the '⛏' menu, under '***Features***'.

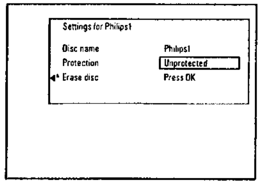
❸ The screen displays '***This will take***...' to show how long the process will take.

❹ To confirm press **OK** .
→ '***Working***...' appears on the TV screen.

→ A bar will move from left to right indicating progress.

Erasing DVD+RW Disc's

❶ In the 'Disc info display' press ▶ .
→ The '***Settings for***' menu appears on the TV screen.



Settings for Philips1
Disc name Philips1
Protection Unprotected
◀* Erase disc Press OK

❷ Select '***Erase disc***' using ▲ or ▼ and confirm with **OK** .
→ '***This will erase all titles Press OK to confirm***' appears on the TV screen..

❸ If you want to delete all the titles, press **OK** to confirm.
Otherwise press ◀ .
→ '***Erasing disc***' appears on the TV screen.
After deletion, the index picture display shows the free space on the disc.

If the disc is empty already, you cannot select '***Erase disc***'.

General

Use 'Programming a recording (TIMER)', to automatically start and stop a recording at a later date.

The DVD recorder will switch to the right programme number and begin recording at the correct time.
On this DVD recorder you can pre-programme up to 30 recordings and 3 reminders (to watch) within a period of one month.

To make a programmed recording, your DVD recorder needs to know:
* the date you want to make the recording
* the programme number of the TV channel
* the start and stop time of the recording
* VPS or PDC on or off

This information is saved in a 'TIMER block'.
Before you begin, make sure the clock is set. If the clock is not set, the '***Time/Date***' menu will appear when you press the **TIMER** ⏲ button.

What is 'VPS/PDC'?
- 'VPS' (Video Programming System)/'PDC' (Programme Delivery Control) are used to control the start and duration of TV channel recordings. If a TV programme starts earlier or ends later than was scheduled, the DVD recorder will then turn on and off at the correct time.

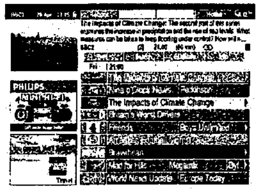
What do I need to know about 'VPS/PDC'?
- Usually the start time is the ***same*** *as the VPS or PDC time. If a different 'VPS/PDC time' is indicated, e.g.: '20.15 (VPS/PDC 20.14)', the* ***VPS/PDC time*** *'20.14' must be entered* ***exactly to the minute*** *during programming.*
If you want to programme a time that is different from the VPS or PDC time, you must switch off VPS or PDC.
- Only one TV program of a TV channel can be controlled using 'VPS/PDC' at a time. If you want to record two or more TV programmes on a TV channel using 'VPS/PDC', you will need to programme these as two separate recordings.
- Since the DVD recorder requires a certain lead time (for getting the disc up to speed and positioning the laser) before recording can start, it is possible that the recorder will miss the first few seconds of a TV show recorded with VPS/PDC.
In this case, disable VPS/PDC and enter a start time one minute earlier.

Programming recordings with the GUIDE Plus+® System

The GUIDE Plus+® System has made it even easier to programme recordings. All you have to do is select the show you want to record from a channel listing.

Preparation:
•) The TV set is switched on, and, if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press **GUIDE/TV** on the remote control.



❷ Use ▲ or ▼ to select the TV station, and ◀ or ▶ to select the show to record.

× **I do not see all available TV channels**
✓ Please check your correct channel line up in the '***Editor***' screen.
Read therefore the section 'The '***Editor***' screen in the chapter 'The GUIDE Plus+® system.
✓ The GUIDE Plus+® '***Grid***' screen contains only those TV channels that were detected by the GUIDE Plus+® system using a 'channel identification'. TV channels that do not have this 'channel identification' are not available in the GUIDE Plus+® system.
Please use 'Manual TIMER programming' to program TV shows of such TV channels.

❸ Confirm using the red function button of the remote control ('***Record***' on the screen).
The TV -show is programmed for recording.
Read the information on the screen.

× ***'Warning, this programme number has not been allocated, please go to Editor to set it.'* appears on the screen**

✓ The programme number of the TV channel is not available in the GUIDE Plus+® system or allocation Is wrong.
To change or check the channel data, proceed as follows:
- Press ▲ .
Select '***Editor***' with ▶ .
- Select the TV channel using ▼ or ▲ .
- Press ▶ to go to the right tile.
In case you can receive the selected channel only via an external receiver, press the red button to select the corresponding source.
- Press the green button.
- Enter the programme number of the TV channel using the number buttons.
If the source you have selected is an external receiver, enter the programme number that you would also enter at the external receiver for this TV channel.

You can also program TV shows that you just want to watch

*Press the green function button ('**Watch**' on the screen) instead of the red.*
The TV show is stored in the memory for favourite shows. The line is displayed in a different colour.

④ Repeat steps ② to ③ to program all your recordings.

⑤ End with the **GUIDE/TV** button.
To find out how you can check which shows you have programmed, read the section on 'How to change or delete a programmed recording (TIMER)'.

If one or more recordings have been programmed '***TIMER***' will light up on the display.

Programming recordings with the ShowView® System

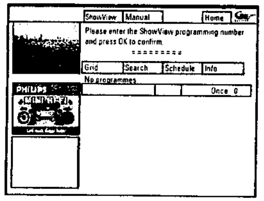
SHOWVIEW®

Thanks to this programming system, you no longer need to tediously enter the date, programme number, start and finish times. All the information needed by the DVD recorder for programming is contained in the ShowView® programming number. This 9-digit ShowView® number is found in most TV listings magazine.

① Switch on the TV set. If required, select the programme number for the DVD recorder.

② Press **TIMER** ⏲ on the remote control.
The '***Schedule***' screen will appear

③ Press the red function button ('***ShowView***').
If this button is not visible in the menu line or without function, no GUIDE Plus+® data is yet available. Therefore, you cannot use programming with the ShowView® system yet.



Please enter the ShowView programming number and press OK to confirm.
= = = = = = = = =
No programmes
Once 0

④ Enter the entire ShowView number. This number is up to 9 digits long and can be found next to the start time of the TV programme in your TV listings magazine.
e.g.: 5-312-4 or 5,312 4
Enter 53124 for the ShowView-number.
Use therefore the number buttons **0..9** on the remote control.
If you make a mistake you can press ◀ or the green action button to go back a position.

⑤ Confirm with **OK** .

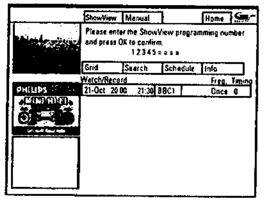
× ***'Please enter programme number'* appears on the screen**

✓ This message appears when the TV channel has not been assigned in the GUIDE Plus+® system yet.
To change channel data, proceed as follows:
- Press ▲ .
- Select '***Editor***' with ▶ .
- Select the TV channel using ▼ or ▲ .
- Press ▶ to go to the right tile.
In case you can receive the selected channel only via an external receiver, press the red button to se lect the corresponding source.
- Press the green button.
- Enter the programme number of the TV channel using the number buttons.
If the source you have selected is an external receiver, enter the programme number that you would also enter at the external receiver for this TV channel.
- Confirm with **OK** .

× **The following message appears on the screen: '*ShowView number wrong*'**

✓ The entered ShowView number is incorrect. Repeat the entry or end with **TIMER** ⏲ .

✓ Check time/date (see chapter 'Installing your DVD recorder', section 'Setting the time & date').



Please enter the ShowView programming number and press OK to confirm.
1 2 3 4 5 = = = =
Watch/Record Freq. Timing
21-Oct 20 00 21:30 BBC1 Once 0

⑥ The decoded data appears after confirmation.
You can use the colour buttons to make the following settings. First, the right tile must be highlighted (▶ button). Check the functions (descriptions) in the corresponding colour field before pressing a button.

Activate 'VPS/PDC'

Keep pressing the yellow action button until 'VPS/PDC' appears instead of the time.

Setting up repeat recordings

You can choose from the following settings with the green action button:
'Frequency': ***'Once'***: *single recordings*
'M-F': *Repeated daily recordings (Monday to Friday).*
'Mon': *Repeated weekly recordings (every week on the same day e.g. Monday).*

⑦ If all information is correct, press the **OK** button. The data is stored.

⑧ To end, press **TIMER** ⏲ .

If one or more recordings have been programmed '***TIMER***' will light up on the display.

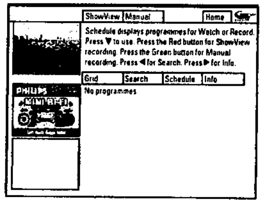
Programming recordings without the ShowView® System

Preparation:
•) The TV set is switched on, and, if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

① Press **TIMER** ⏲ on the remote control.
→ The '***Schedule***' screen appears

× **I will see some informations about the GUIDE Plus+® System**

✓ The GUIDE Plus+® System was not installed yet. Read therefore in the chapter 'The GUIDE Plus+® System' the section 'Set up the GUIDE Plus+® System'.



Schedule displays programmes for Watch or Record. Press ▼ to use. Press the Red button for ShowView recording. Press the Green button for Manual recording. Press ◀ for Search. Press ▶ for Info.
No programmes

② Press the green button.
→ The current date will be displayed.

③ Enter the date using the number buttons **0..9**

④ Confirm with **OK** .

How can I correct wrong entries?

If you have already confirmed the entry with **OK** *, you can select one of the following functions:*
Repeat entry: Green colour button
Cancel: Red colour button

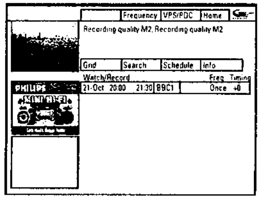
⑤ Enter the start time for the show using the number buttons **0..9** .
Confirm with **OK** .

⑥ Enter the finish time for the TV show using the number buttons **0..9** Confirm with **OK** .

⑦ Check the data you entered.

○ If necessary, go back a position to change entered data using the green function button.

❽ Enter the programme number of the TV channel using the number buttons **0..9**



Selecting a TV channel from the listing

You can only use this function if data from the GUIDE Plus+® system is already available.

- *Press the yellow function button. You will see an overview of all channels*
- *Select the TV channel you want to program using* ◄ , ► , ▼ , ▲ . *You can browse back or forth using* ▶▶I , I◀◀ .
- *Confirm with* **OK** .

Programme numbers of the scart sockets 'EXT1' and 'EXT2'

You can also program recordings from external sources.

- *Select the corresponding input socket using* ▼ *or* ▲ . ***'EXT1'*** *(* **EXT1 TO TV-I/O** *),* ***'EXT2'*** *(* **EXT2 AUX-I/O** *).*
- *Confirm with* **OK** .

Changes using the colour buttons

You can use the colour function buttons to make the following settings. Make sure that the right tile is selected.

'Frequency': Green function button
'Once': *single recordings*
'M-F': *Repeated daily recordings (Monday to Friday).*
'Mon': *Repeated weekly recordings (every week on the same day, e.g. Monday).*

Activate VPS/PDC ('Timing'): Yellow function button
Using this button, you can activate (appears) or deactivate ('VPS/PDC' disappears) 'VPS/PDC' in tile ***'Timing'***

❾ To find out how you can go back and change the data, read the section on 'How to change or delete a programmed recording (TIMER)'

If any of the TIMER blocks are in use, ***'TIMER'*** will light up on the recorder display.

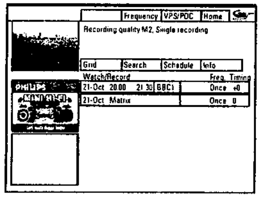
How to change or delete a programmed recording (TIMER)

Preparation:

•) The TV set is switched on, and, if necessary, the programme number for the DVD recorder has been selected.

•) the DVD recorder is switched on.

❶ Press **TIMER** ⏲ on the remote control while the DVD recorder is switched on.
→ The '***Schedule***' screen will appear.



❷ Use ▼ or ▲ to select the programmed recording you want to change or delete.
Depending on the programming method (using GUIDE Plus+® system, with/without ShowView® system), it is not possible to carry out certain changes using the function buttons. Therefore, always check the function of the corresponding button (description in the colour field) before pressing the button.

Delete programmed recording

Press the red action button in the left tile.

Changing the TV channel

You can make this change only for recordings that were not set using the ***'Grid'*** *screen.*
In the case of recordings using the ***'Grid'*** *screen, centre tile is not available.*

- *Select the centre tile with* ► .
- *Press the yellow function button.*
- *Select the TV channel you want using* ▼ , ▲ , ◄ , ► . *Sender.*
- *Confirm with* **OK** .

Activate VPS/PDC

Keep pressing the yellow function button in the right tile until 'VPS/PDC' appears in the ***'Timing'*** *line instead of the time.*
If you programm a recording using the GUIDE Plus+® System, the VPS/PDC time will be taken automatically. VPS/PDC can be switched on or off without readjusting the start time.

Setting up repeat recordings

You can choose from the following settings in the right tile using the green function button:

'Frequency' 'Once': *Once recordings*
'M-F': *Repeated daily recordings (Monday to Friday).*
'Mon': *Repeated weekly recordings (every week on the same day, e.g. Monday).*

❸ To end, press **TIMER** ⏲ .

A message appears few minutes before the recording is about to start if the DVD-recorder is tuned to a different TV channel as programmed. If you confirm this message the TV channel will be changed and the reording started.

Cancel a programmed recording in progress

A programmed recording will run as long as the end of the TV show is reached (end time of the schedule or end time out of the GUIDE Plus+® System)
If you switch off the DVD-Recorder with **STANDBY** ⏻ the DVD-Recorder will be switched off after the recording is completed.
If you want to cancel the programmed recording proceed as follows:

❶ Press the red function button

❷ Select '***Yes***' using ◄ and confirm with **OK** .

❸ The programmed recording can also be canceled as described in the previous section 'How to chnage or delete a programmed recording (Timer)'.

This section describes how you can adjust the functions of the HDD to your personal preferences.
When you press **SYSTEM MENU** , a so-called puck appears on a line.
If there are further selection options within a line, an arrow will appear in the respective segments. Using the corresponding buttons on the remote control (e.g. ▶) you can call up further features or selection options.

Preparation:
•) Switch on the TV set and, if necessary, select the programme number for the DVD recorder.
•)Switch on the DVD recorder.

❶ Press **TUNER** on the remote control to switch to HDD mode.

You can also switch to HDD mode by pressing **BROWSER HDD** but you will not see the picture of the currently selected TV channel as a background picture.

❷ Press **SYSTEM MENU** on the remote control
→ The system menu for the HDD appears.

❸ Select the corresponding line using ▼ or ▲ .

- If the arrow ▶ in the puck is visible in one of the lines, you can select additional functions with ▶ on the remote control.
- To return to the previous menu, keep pressing ▼ until the top menu item is selected.
Press ◀ to return to the previous menu item.

❹ Select the corresponding function using ▼ or ▲ , or the setting with ◀ or ▶ . Select the functions you want to change as described in the following pages.

❺ Confirm the new setting with **OK** .

❻ Close the menu item with ◀ .

Toolbar

Options

In this menu, you can choose functions for the playback of recordings (titles) on the HDD:

'Audio'

Selection of the language for the TV show currently selected on the DVD recorder.
'Lang I' or 'Lang II' in the display also indicates whether a TV show is broadcast in two languages. This setting only affects playback through the internal tuner of the DVD recorder. The setting for the recording will not be affected.
If you also want to use/change the language for the recording, you must change the language in the 'Preferences' menu.

- ***'Off'***
Recording is done in stereo. If you are receiving a 'two-channel' TV show, you will hear both languages simultaneously. You can switch to the desired language only on the TV set or the in audio device you may have connected to the DVD recorder ('balance' feature).
- ***'Lang. I'***
Playback is carried out in the original or main language.
'Lang I' also appears in the display.
- ***'Lang.II'***
Playback is carried out in the dubbed language available.
'Lang II' appears in the display.

'Zoom'

Using this function, you can enlarge (blue function button) or reduce the size (yellow function button) of the still picture or pan through the enlarged picture using ▼ , ▲ , ◀ , ▶ during playback from the HDD (time shift buffer or media browser).
Press the red function button to stop this function.

'Time search'

Using this feature, you can search a position by time. You can use this feature both for titles in the media browser and for playback from the time shift buffer.

"

This function is only required if recordings were made through a video camera connected to the **DV IN (CAM2)** socket. In this case, you can display/hide information on the date and time of the recording.

Preferences

Recording

In this menu, you can select one of the following functions for recording:

I can not select some functions
During a recording the selection of some functions are not possible. e.g. ***'HD Buffer'.***

'Record mode'

Select from the settings displayed the record mode (picture quality of the recording). M1, M2x, M3,... M8.
For recordings on a DVD+RW/+R (archiving function) always the recording mode used for the recording on the HDD will be taken.
Observe the maximum possible recording time on a DVD+RW/+R.
The maximum possible recording time on the HDD depends from the recording mode and the average length of the recordings (titles).

- ***'M1'***
High Quality (high recording quality)
offers the best picture quality and a recording time of:
DVD+RW/+R: 1 hour.
HDD: approx. 16 hours
- ***'M2'***
Standard Play (pre-recorded DVD quality)
offers standard picture quality and a recording time of:
DVD+RW/+R: 2 hours.
HDD: approx. 32 hours
- ***'M2x'***
Standard Play plus (better than S-VHS quality)
offers standard picture quality and a recording time of:
DVD+RW/+R: 2,5 hours.
HDD: approx. 40 hours
- ***'M3'***
Long Play (S-VHS picture quality).
Recording time of:
DVD+RW/+R: 3 hours.
HDD: approx. 48 hours
- ***'M4'***
Extended Play (better than VHS picture quality).
Recording time of:
DVD+RW/+R: 4 hours.
HDD: approx. 64 hours
- ***'M6'***
Super Long Play (VHS-picture quality).
Recording time of:
DVD+RW/+R: 6 hours.
HDD: approx. 96 hours if the average recording time for a title is at least 20 minutes.
- ***'M8'***
Super Extendend Play (VHS-LP-picture quality).
Recording time of:
DVD+RW/+R: 8 hours.
HDD: approx. 128 hours if the average recording time for a title is at least 20 minutes.

'Camera mode'

Select the recording mode (picture quality for recording) from one of the displayed settings for the recording from external sockets. ***M1***, ***M2x***, ***M3***,... ***M8***). Read the previous section (Record Mode) on the picture quality that corresponds to each setting.

'Chapters'

- ***'Off'***
No auto chapters
- ***'On'***
Automatic chapter marking after 5 minutes (depending on the selected recording quality).
- ***'Smart'***
Chapter marking will depend on the time stamp of the digital camera connected to the **DV IN (CAM2)** socket.

'HD Buffer'

Choose one the displayed settings to define how long a recording will be kept stored.

- **'1h'**
The recording will be kept stored for 1 hour
- **'6h'**
The recording will be kept stored for 6 hours

'Language'

Here you can set the default language to be used for the recording of bilingual TV shows. You can no longer change the language once playback has started.

- ***'Off'***
Recording is done in stereo. Both languages will be recorded. e.g.: Left channel: Original language, Right channel: Dubbed language.
- ***'Lang. I'***
Recording is carried out in the standard language.
- ***'Lang.II'***
Recording is carried out in the dubbed language available.

'Sat record'

If a video signal is detected at the **EXT2 AUX-I/O** scart socket, recording will begin.

- ***'On'***:
Sat Record is activated.
- ***'Off'***:
Sat Record is deactivated.

'Direct rec.'

If a recording starts while the DVD recorder is switched off, the TV channel currently selected on the TV set will be compared with the TV channels stored in the DVD recorder.
- If the TV channel is found, recording will start.
- If the TV channel is not found, a message will appear on the screen and in the display.

- O *'On'*:
  Direct Record is activated.
- O *'Off'*:
  Direct Record is deactivated.

'Filter'

Here you can choose between:

- O *'Sport'*:
  Picture quality is optimised for rapid movements in the recording modes (picture qualities) M3 to M8.
  Please observe that this setting will reduce the overall impression of the picture quality.
- O *'Normal'*:
  Better overall picture quality.
  Please observe that this setting may cause picture artefacts (MPEG artefacts) to appear in rapid movements.

I can not select this function

*Check the actual record mode selected. This function is available in the record modes **'M3'** to **'M8'** only.*

'Safety Slot'

Here you can enter a time (one to five minutes) when a programmed recording (Timer) should start earlier and end later.This is necessary if the information from the GUIDE Plus+® system about the starttime were sent too late or too early

'Set up'

'System'

In this menu, you can select one of the following features:

'Auto delete'

If there is no space for new recordings on the HDD, you can determine here whether recordings will be automatically deleted or not. You can see the titles and the sequence according to which they will be deleted in the *'Delete Order'* setting in the media browser. For more information, read the chapter 'The Media Browser'.

- O *'On'*: Recordings will be automatically deleted in the following order:
  1) Titles that have already been viewed. Symbol *'Symb seen'*.
  2) Titles that were not protected. No symbol *'Symb protect'* available.
- O *'Off'*: No recordings will be automatically deleted.

'Jump forward'

Set the time you want to jump forward when you press **JUMP FWD** in the time shift buffer.

'Jump back'

Set the time you want to jump backward when you press **JUMP BACK** in the time shift buffer.

Use the setting 5 minutes for *'Jump forward'*and 1 minute for *'Jump back'*, to make it easy to skip unwanted scenes.

'Installation'

Please observe that for selection of function in this menu the Time shift Buffer will be flushed. If the 'Time Shift Buffer ' contains important recordings, save them with the **REC/OTR ●** button first. Read additional information about the 'Time Shift Buffer' in the chapter 'The Time Shift Buffer'.

- O *'Autom. search'*:
  Automatic channel search
- O *'Follow TV'*:
  Sorting TV channels automatically
- O *'Manual search'*:
  Manual TV channel search
- O *'Sort TV channels'*:
  Sorting TV channels manually
- O *'Time/Date'*:
  Setting/Correcting the time and date

For more information, please read chapter 'Installing your DVD recorder'.

'Flush Buffer'

Using this function, you can store recordings on the HDD that were marked for recording in the time shift buffer. Recordings that were not marked will be deleted.

- O *'Yes'*:
  Recordings will be stored
- O *'No'*:
  This interrupts the process

Additional user preferences

This section describes how you can make additional personal settings. The symbols have the following meaning:

Picture settings

Sound settings

Language settings

Additional settings

Disc settings

Record settings

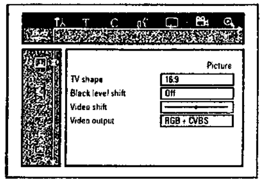
Installation

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

1. Press the **DISC MENU** button and then the **SYSTEM MENU** button on the remote control.
   → The menubar appears.
2. Select 'Tλ' using ◀ oder ▶ and confirm with
3. Select the corresponding function using ▼ or ▲ and confirm with ▶ .
4. Select the corresponding line using ▼ or ▲ and confirm with ▶ . For more information on each function, read the following pages.
5. Select the corresponding function using ▼ or ▲ , or the setting with ◀ or ▶ . Select the functions you want to change as described in the following pages.
6. Confirm the new setting with **OK** .
7. Close the menu item with ◀ .

Picture settings

You can select the following functions in this menu:



Picture

TV shape 16:9
Black level shift Off
Video shift
Video output RGB + CVBS

'TV shape'

The picture signal from your DVD recorder can be set to match your TV set:

- O *'4:3 letterbox'*
  for a widescreen picture with black bars at the top and bottom
- O *'4:3 panscan'*
  for a full-height picture with the sides trimmed.
- O *'16:9'*
  for a widescreen TV set (16:9 screen ratio)

'Black level shift'

Adapts the colour dynamics for NTSC playback when switched to *'On'*

'Video shift'

Use this feature to adjust the position of the picture on your TV left or right using ◀ , ▶ to suit the screen of your TV set.

'Video output'

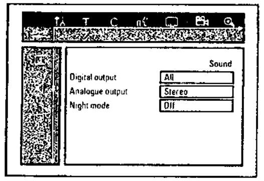
Since RGB and S-VIDEO signals sometimes use the same connections on a scart cable, the two signals cannot be transmitted simultaneously. With these settings, you can decide whether RGB or S-VIDEO signals are to be transmitted. This setting affects only the scart sockets of the DVD recorder (**EXT1 TO TV-I/O** output socket and **EXT2 AUX-I/O** input socket).
Please also observe which signals are available at which scart socket of the TV set or how the scart sockets need to be switched.
If necessary, consult the instruction manual of your TV set.

- O *'RGB + CVBS'*
  Depending on the TV set you are using, switching between the 'RGB' and the 'Video(CVBS/FBAS)' signal is done automatically. If the picture scrolls to the side or colour quality problems appear on some TV sets when the setting is *'RGB + CVBS'*, you must select *'CVBS only'*.
- O *'S-video only'*
  Only the S-Video signal will be processed at both scart sockets (**EXT1 TO TV-I/O** output socket and **EXT2 AUX-I/O** input socket).
  In case the scart socket of the TV set is not suitable for S-VIDEO (Y/C) signals, you will only see a black&white picture, although the recording will be made in colour. Moreover, only the video (CVBS, FBAS) signal will be used for recordings via the **EXT1 TO TV-I/O** scart socket.
  Please observe that when making recordings from a video recorder that transmits only video (CVBS/FBAS) signals through the scart cable, recordings via scart socket **EXT2 AUX-I/O** may be made in black and white.
  Therefore, use this setting with caution.
- O *'CVBS only'*
  Only the video (CVBS/FBAS) signal is transmitted, regardless of the video signals (RGB, Y/C) at the scart sockets. This setting is selected automatically when no 'RGB' or 'S-VIDEO' signal is detected at the scart socket.

When selecting the settings *'S-video only'* or *'CVBS only'*, the RGB signal is switched off.

Sound settings

You can select the settings in this menu depending on which audio outputs are used.
If you only use the analogue audio output (red and white socket **AUDIO OUT L/R**), select the setting '***Off***' in the '***Digital output***' menu.



Sound
Digital output All
Analogue output Stereo
Night mode Off

'*Digital output*'

You can select one of the following settings for devices that are connected to the **COAX OUT** or **OPTICAL OUT** sockets:

- '***All***'
  Dolby Digital and DTS signals are fed unaltered to the digital output. MPEG-2 multi-channel signals are converted to PCM (Pulse Code Modulation).
  For receivers/amplifiers **with digital multi-channel decoders.**
- '***PCM only***'
  Digital and MPEG-2 multi-channel signals are converted to PCM (Pulse Code Modulation). For receivers/amplifiers **without digital multi-channel decoders.**
- '***Off***'
  Digital output switched off.
  For devices **with analogue audio input.**

'*Analogue output*'

You can select one of the following settings for devices that are connected to the analogue audio output ():

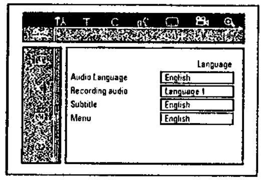
- '***Stereo***'
  For devices without DolbySurround or TruSurround. Use this setting if the DVD recorder is only connected to a stereo TV set.
- '***Surround***'
  Dolby Digital and MPEG-2 multi-channel are mixed down to a Dolby Surround-compatible two-channel output signal.
  For devices **with Dolby Surround / Pro Logic Decoder** .

'*Night mode*'

Night mode optimises the sound for playback at low volume. You are therefore less likely to disturb your neighbours. This only works with Dolby Digital audio on DVD video discs.

Language settings

You can select the following settings in this menu:



Language
Audio Language English
Recording audio Language 1
Subtitle English
Menu English

'*Audio Language*'

Playback audio language.

'*Subtitle*'

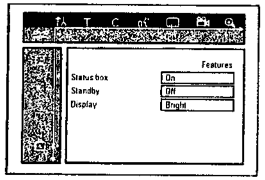
Subtitle language

'*Menu*'

Screen menu language

Additional settings

You can select the following functions in this menu:



Features
Status box On
Standby Off
Display Bright

'*Status box*'

During play back from a disc, information of the current operating status (counter, playback) will be shown on the TV screen.
You can switch off the information about the operating status so that the on-screen display is not recorded when making recordings on additional devices.

- '***On***'
  The OSD information appears for a few seconds in each selected mode and then disappears.
- '***Off***'
  The OSD information is switched off. It is **no longer** displayed on the screen.

'*Standby*'

You can switch off the clock display on your DVD recorder to save energy. Programmed recordings will be carried out despite of this.
In addition, you can have the most important features of your DVD recorder appear in scrolling text in the display (demo).

- '***Low power***':
  When the DVD recorder was switched off using **STANDBY ⏻** , the clock display is also switched off.
- '***Off***':
  When the DVD recorder was switched off using **STANDBY ⏻** , the clock display remains visible.
- '***Demo mode***':
  When the DVD recorder is switched off using **STANDBY ⏻** , a list of the most important features appears in the display.

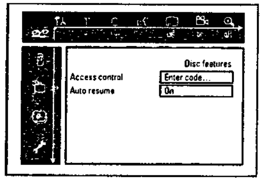
'*Display*'

You can change the brightness of the display on the DVD recorder. This setting only affects the DVD recorder when it is switched on.

- '***Bright***':
  The display appears with normal brightness. The disc tray light is switched on.
- '***Dimmed***':
  The display appears less bright. The disc tray light is switched off.
- '***Off***':
  The display and the disc tray light are switched off.

Disk feature menu

In this menu, you can make changes that relate to the disc:



Disc features
Access control Enter code...
Auto resume On

'*Access control*'

Please read the next chapter 'Access control (child lock)'.

Auto resume

If playback of a pre-recorded DVD video disc or video CD is interrupted (using **STOP ■** or **OPEN/CLOSE ▲**), playback will resume where it stopped after you reinsert the disc. This applies not only to the current disc but also to the last 20 discs you played.

You can switch off this feature if you do not want it.

'*PBC*'

This line appears only if you insert a VCD.
Using this function, you can activate or deactivate the PBC menu (Playback Control) of a Video CD. For more information, read section 'Playing a (Super) Video CD' in chapter 'Playback'.

'*Finalise disc*'

This function allows you to finalise DVD+R discs. If the disc has already been finalised, this line will appear darker.

'*Adapt disc format*'

If a DVD+RW has been recorded in a PC drive or a different DVD recorder, the index screen may not be displayed properly.
This feature allows you to adjust the format of the disc.
Therefore, this feature is only visible if the disc format is different.

Child lock (DVD and VCD)

This feature enables discs to be locked for children.
When Child Lock is on, a 4-digit code (PIN) needs to be entered before a disc can be played.
You can also decide whether the inserted disc should always be played or should be played only once, despite the child lock

•)'***Play always***':
This disc is stored in a memory with space for 50 child-safe discs. If more than 50 discs are stored, the last disc in the list is removed and the new disc is added. The screen shows 'Child safe' at the start of playback.

•)'***Play once***':
This disc is only authorised for single playback. If the recorder is switched off, the PIN code must be re-entered.

Activating/deactivating child lock

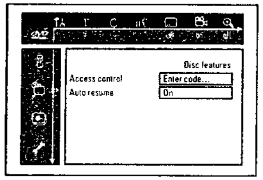
Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press **TUNER** and then **SYSTEM MENU** on the remote control. If playback from a disc starts automatically, remove the disc (button **OPEN/CLOSE ⏏**).
→ The menubar appears on the screen.

❷ Select the 'T⅄' icon using ◀ or ▶ .

→ The 'SYSTEM MENU' appears.

❸ Select '🗀(***Disc features***)' using ▼ or ▲ and confirm with ▶ .



Access control: Enter code...
Auto resume: On

❹ Confirm '***Access control***' using ▶ .

❺ Enter a 4-digit code of your choice.
This code will also be used for locking titles on the HDD (Media Browser).
→ If the code is new, you may have to enter the code a second time as confirmation.

❻ Select '***Child lock***' using ▲ or ▼ and confirm with ▶ .

❼ Select the '🔓' icon using ▼ or ▲ .

❽ Confirm with **OK** .

❾ Quit the feature using ◀ and **SYSTEM MENU** .

Unauthorised discs can only be played by entering the four-digit PIN code.
To deactivate the child lock, select the '🔓' icon in ❼ .

Authorising a disc

❶ Insert a disc. The access control box will appear after a short delay.

❷ Using ▲ or ▼ select '***Play once***' or '***Play always***'.

❸ Enter your PIN code using the number buttons **0..9** .

Double-sided DVDs may have a different ID for each side. For these discs, each side must be authorised. Video CDs may have a different ID for each disc. For these CDs, each disc must be authorised.

Locking unlocked discs

To lock a disc that was formerly authorised follow the instructions below

❶ Insert a disc. Playback starts automatically. If the playback does not start automatically, press **PLAY ▶** .

❷ Press the **STOP ■** button while the '—safe—' icon is visible. The icon changes to '—locked—'. The disc is now locked.

Parental level control (DVD video only)

Films on pre-recorded DVD discs may contain scenes not suitable for children. Therefore, some discs may contain 'Parental Control' rating information that applies to the entire disc or to certain scenes on the disc.
The appropriate scenes have filter values that reach from 1-8. If such a scene is detected during playback, the filter value set on the DVD recorder is compared to the scene. If the filter value is higher than the setting, an alternative scene will be played (if available).
Most DVDs apply the rating to an entire DVD. Therefore, if certain scenes exceed the rating you select, the entire disc will be blocked from viewing.

Activating/deactivating parental level control

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

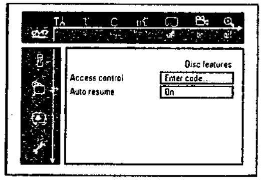
❶ Press **DISC MENU** and then **SYSTEM MENU** on the remote control.
→ The menubar appears.

❷ Select the 'T⅄' icon using ◀ or ▶ .

❸ Press the **SYSTEM MENU** button on the remote control.

❹ Select the 'T⅄' icon using ◀ or ▶ .

❺ Select '🗀(***Disc features***)' using ▼ or ▲ and confirm with ▶ .



Access control: Enter code...
Auto resume: On

❻ Confirm '***Access control***' using ▶ .

❼ Enter a 4-digit code of your choice. If the code is new, you may have to enter the code a second time as confirmation.

❽ Select the '***Parental level***' using ▲ or ▼ and confirm with ▶ .
A bar appears to select the parental level.

❾ Select the appropriate rating using ▼ , ▲ or the number buttons **0..9** .

What do the ratings mean?
Rating 0 (displayed as '--') parental control not active.
Rating 1 (suitable for children)
Rating 8 (only suitable for adults)

What happens if a DVD scene contains a higher level than the rating set?
If the recorder does not find a suitable alternative, playback will stop and you must enter the four-digit code.

❿ Confirm with **OK** . Quit using ◀ and **SYSTEM MENU** .

Changing the country

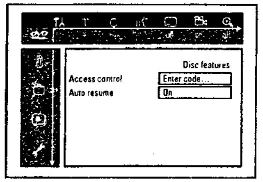
The set filter values depend on the respective country. It is therefore necessary to enter the country to which these filter values apply.

Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press the **TUNER** and then the **SYSTEM MENU** button on the remote control.
→ The menubar appears on the screen.

❷ Select the 'T⅄' icon using ◀ or ▶ .

❸ Select line '🗀(***Disc features***)' using ▼ or ▲ and confirm with ▶ .



Access control: Enter code...
Auto resume: On

❹ Confirm the line '***Access control***' using ▶ .

❺ Enter your four-digit code. If the code is new, you may have to enter the code a second time as confirmation.

❻ Select '***Change country***' using ▼ or ▲ and confirm with ▶ .

❼ Select the corresponding country using ▲ or ▼ and confirm with **OK** .

❽ To end, press ◀ and then **SYSTEM MENU** .

Changing the PIN code

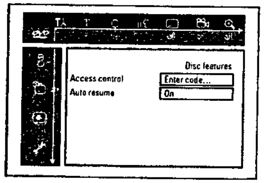
Preparation:
•) The TV set is switched on, and if necessary, the programme number for the DVD recorder has been selected.
•) the DVD recorder is switched on.

❶ Press the **TUNER** and then the **SYSTEM MENU** button on the remote control.
→ The menubar appears.

Access control (Child Lock)

② Select the '' icon using ◀ or ▶ .

③ Select '*(**Disc features**)*' using ▼ or ▲ and confirm with ▶ .



Disc features

Access control: Enter code...

Auto resume: On

④ Confirm '***Access control***' using ▶ .

⑤ Enter your four-digit PIN code. If the code is new, you may have to enter the code a second time as confirmation.

⑥ Select '***Change code***' using ▲ or ▼ and confirm with ▶ .

⑦ Enter the new code using the number buttons **0..9** . Enter the same code again as confirmation.

⑧ Quit using ◀ and **SYSTEM MENU** .

I have forgotten my code

Press **STOP ■** *four times (step ⑤), then press* **OK** *. Access control is now switched off. You can now enter a new code as described above.*

4. Mechanical Instructions

4.1 Dismantling and Assembly of the Set

Remark: Exploded views can be found in chapter 10.

4.1.1 Manually opening the tray

- In case the loader is defective or cannot be opened electrically you can open the tray manually.
- Through a slot at the underside of the cabinet a slider that unlocks the tray can be accessed.
  However the slot is covered by an adhesive tape on the cabinet of the drive to prevent dust coming into the drive. Push through this adhesive tape by means of a thin screwdriver and move the slider to the left, see picture 4-1.
- **Make sure that an adhesive tape has again been applied to the drive when repair is finished!**

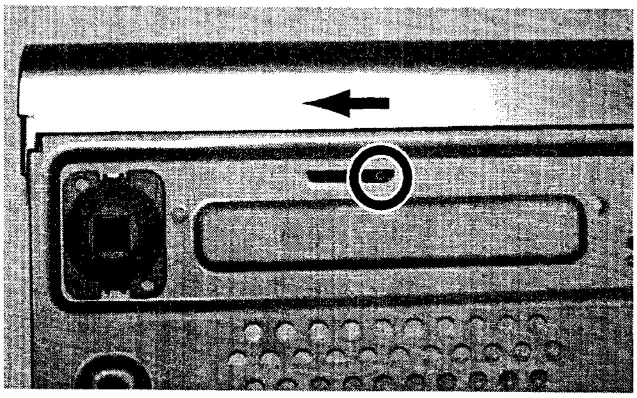


Figure 4-1

4.1.2 Hard Disc and Power Supply Module

- Remove the 3 screws (1) fixing the HDD module, see figure 4-2
- Move the the hard disc module out of the slots in the front plate (2) and put the hard disc to the side
- The fixing screws for HDD and power supply module are at the underside of the mounting bracket. Release the corresponding screws, see figure 4-3.

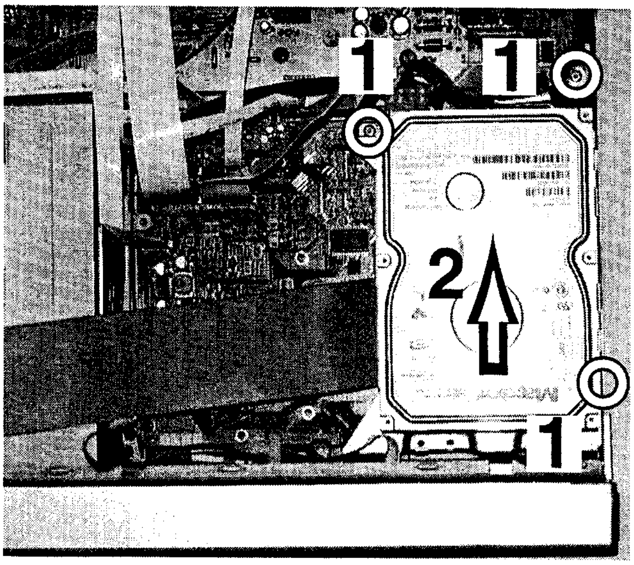


Figure 4-2

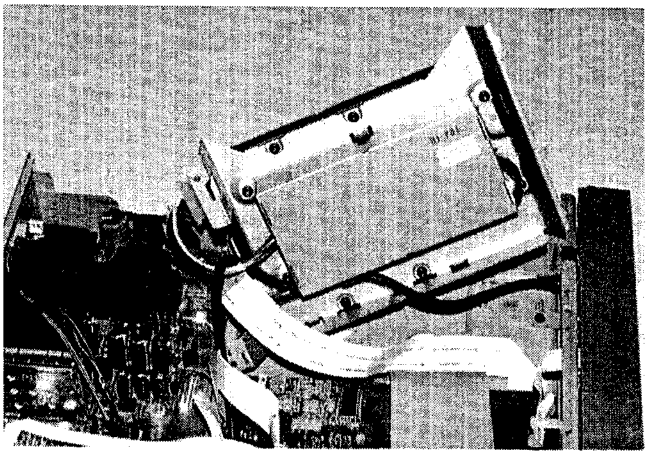


Figure 4-3

4.1.3 Front

- Before removing the front panel the tray has to be in the opened position.
- Remove the top cover
- Remove tray front by pulling it upwards (1), see figure 4-4
- The black i-Link cable could be unplugged temporarily (2), see figure 4-5
- Remove the Hard Disc module as described in previous chapter and put it to the side (3)
- Remove the three screws (4) fixing the front panel
- Release the cables from the clamps (5)
- Release the two snap hooks at the sides (6) and remove the front (7), see figure 4-6
- Release the screws (8), see figure 4-7, to remove the front plate (9), see figure 4-8

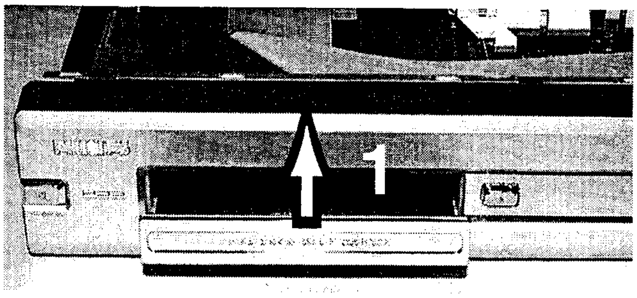


Figure 4-4

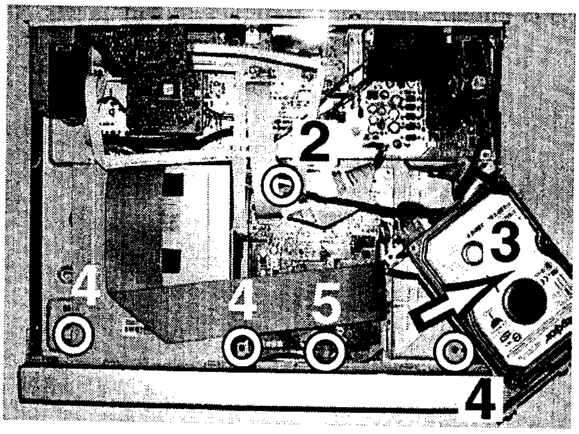


Figure 4-5

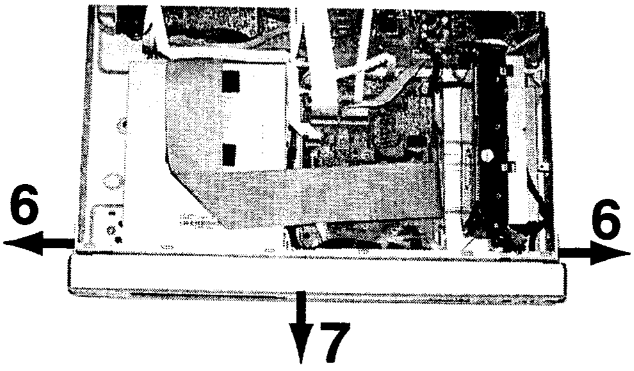


Figure 4-6

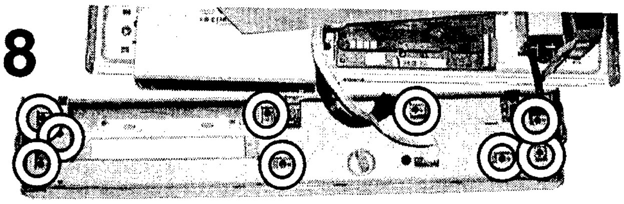


Figure 4-7

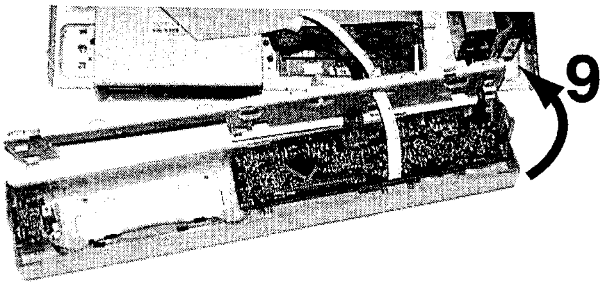


Figure 4-8

4.1.4 EPG Board

- Remove the two screws (1), see figure 4-9
- Release the snap hook (2)
- Turn the PCB in the service position, see picture 4-10

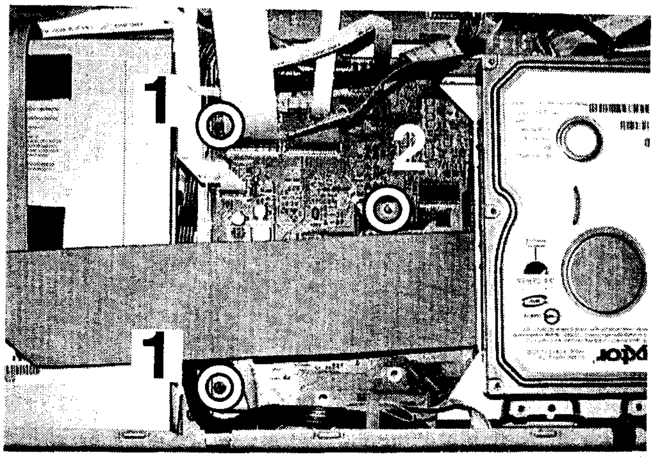


Figure 4-9

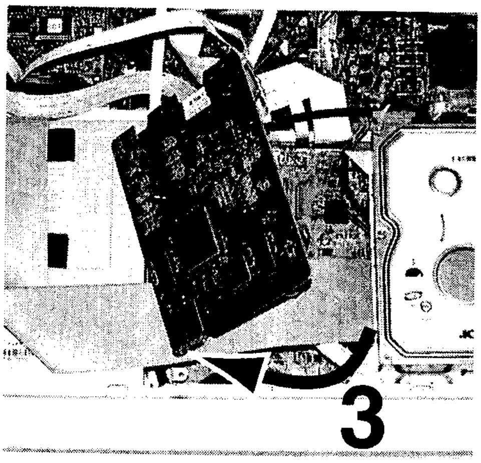


Figure 4-10

4.1.5 Digital Board

- Remove the EPG Board as stated in previous chapter
- Release the hard disc module if not already done
- Remove the remaining 3 screws that fix the Digital Board (1), see figure 4-11, and turn the Digital Board to the required service position, see figure 4-12

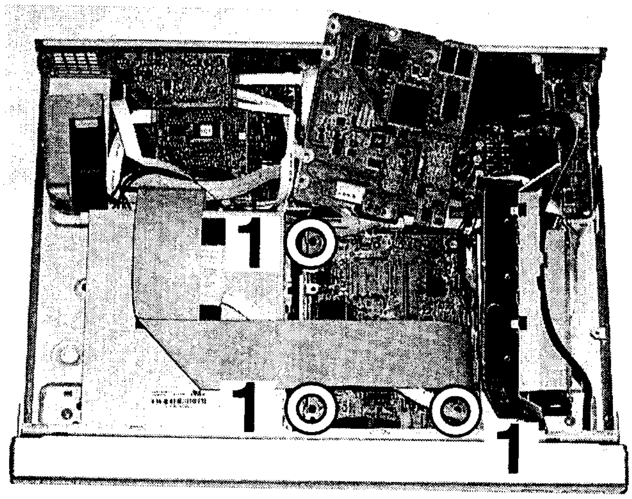


Figure 4-11

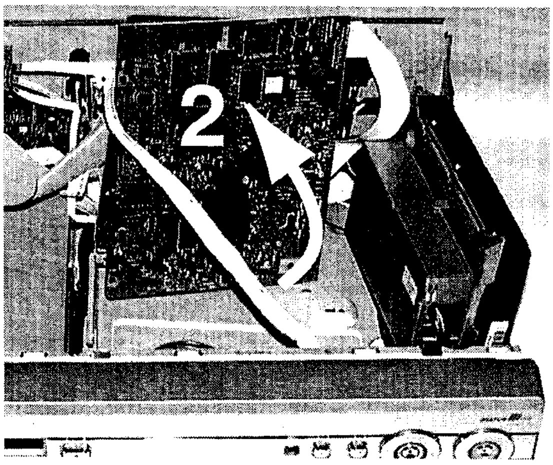


Figure 4-12

4.1.6 Basic Engine

- Remove the tray front
- Remove the 4 screws that fix the drive, see figure 4-13, and pull out the drive

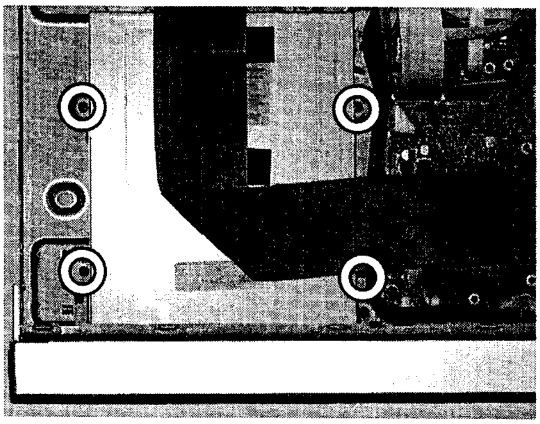


Figure 4-13

4.1.7 Analog Board

- Remove the 3 screws (1) that fix the back plate to the bottom plate, see figure 4-14
- Remove the Fan assy by releasing the fixing screws (2)
- Remove the 3 screws (3) fixing the Analog Board to the bottom plate
- Remove the 2 screws fixing the hard disc module (4), see figure 4-15
- Remove screw safety holder (5)
- Unlock the two snaps hooks at the left and right (6), see figure 4-16, and pull the board and backplate out gently (7)
- Turn the PCB in the service position (8), see figure 4-17

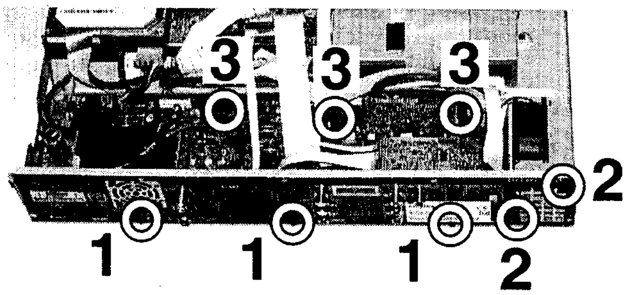


Figure 4-14

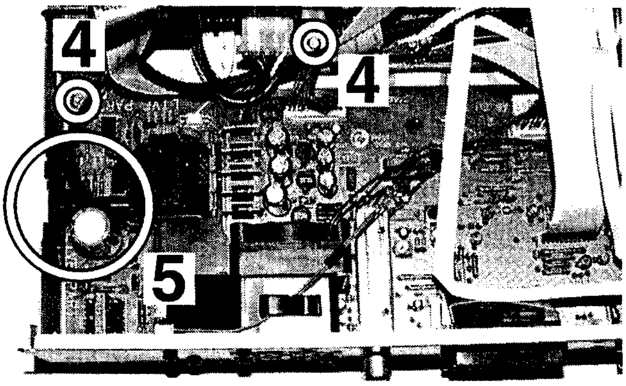


Figure 4-15

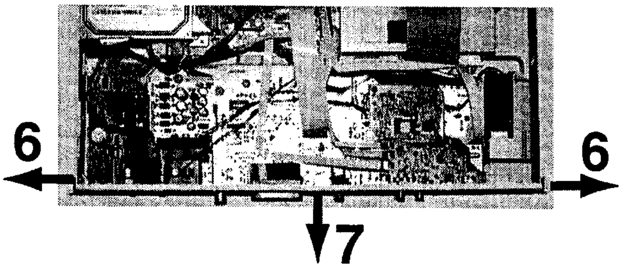


Figure 4-16

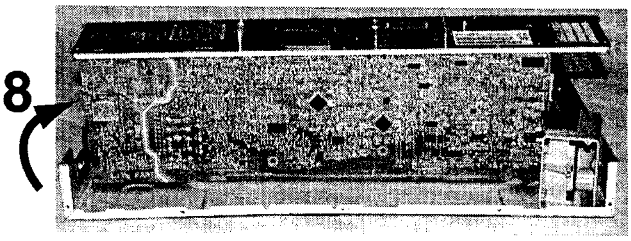


Figure 4-17

5. Diagnostic Software

Due to the complexity of the DVD recorder, the time to find a defect in the recorder can become long. To reduce this time, the recorder has been equipped with Diagnostic and Service software (DS). The DS offers functionality to diagnose the DVDR hardware and tests the following:

- Interconnections between components
- Accessibility of components
- Functionality of the audio and video paths

This functionality can be accessed via several interfaces:

1. End user/Dealer script interface
2. Command Interface

5.1 End User/Dealer Script Interface

5.1.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone DVD recorder. During this mode, a number of hardware tests (nuclei) are automatically executed to check if the recorder is faulty. The diagnosis is simply a "fail" or "pass" message. If the message "FAIL" appears on the display, there is apparently a failure in the recorder. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the recorder because the nuclei in this mode don't cover the complete functionality of the recorder.

5.1.2 Structure

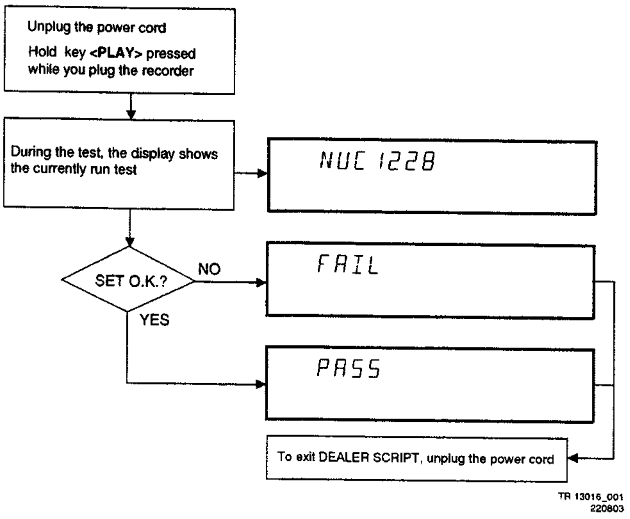

Unplug the power cord
Hold key <PLAY> pressed while you plug the recorder
During the test, the display shows the currently run test
NUC 1228
SET O.K.?
NO
YES
FAIL
PASS
To exit DEALER SCRIPT, unplug the power cord
TR 13016_001 220803

Figure 5-1

The End use/Dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone DVD recorder.

5.1.3 Contents

Included tests:	1.DS_ANAB_COMMUNICATIONECHO_NUC 2.DS_DCB_COMMUNICATIONECHO_NUC 3. DS_BROM_COMMUNICATION_NUC 4. DS_SYS_SETTINGSDISPLAY_NUC 5. DS_CHR_DEVTYPEGET_NUC6. DS_CHR_INT_PIC_NUC7. DS_CHR_DMA_NUC8. DS_BROM_WRITEREAD_NUC9. DS_NVRAM_COMMUNICATION_NUC10. DS_NVRAM_WRITEREAD_NUC11. DS_SDRAM_WRITEREADFAST_NUC12. DS_FLASH_WRITEREAD_NUC13.DS_FLASH_CHECKSUMPROGRAM_NUC14.DS_SYS_HARDWAREVERSIONGET_NUC15. DS_VIP_DEVTYPEGET_NUC16. DS_VIP_COMMUNICATION_NUC17. DS_DVIO_LINKDEVTYPEGET_NUC18. DS_DVIO_PHYDEVTYPEGET_NUC19. DS_DVIO_LINKCOMMUNICATION_NUC20. DS_DVIO_PHYCOMMUNICATION_NUC21.DS_PSCAN_COMMUNICATIONDENC_NUC22.DS_PSCAN_COMMUNICATIONDEINTERLACER_NUC23. DS_BE_COMMUNICATIONECHO_NUC24.DS_ANAB_COMMUNICATIONIICNVRAM_NUC25.DS_ANAB_COMMUNICATIONIICTUNER_NUC26.DS_ANAB_COMMUNICATIONIICSOUNDPROCESSOR_NUC27.DS_ANAB_COMMUNICATIONIICAVSELECTOR_NUC28. DS_ANAB_CHECKSUMPROGRAM_NUC

5.2 Trade Mode

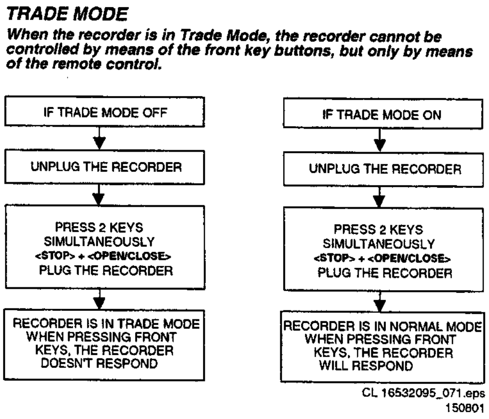

TRADE MODE
When the recorder is in Trade Mode, the recorder cannot be controlled by means of the front key buttons, but only by means of the remote control.
IF TRADE MODE OFF
UNPLUG THE RECORDER
PRESS 2 KEYS SIMULTANEOUSLY <STOP> + <OPEN/CLOSE> PLUG THE RECORDER
RECORDER IS IN TRADE MODE WHEN PRESSING FRONT KEYS, THE RECORDER DOESN'T RESPOND
IF TRADE MODE ON
UNPLUG THE RECORDER
PRESS 2 KEYS SIMULTANEOUSLY <STOP> + <OPEN/CLOSE> PLUG THE RECORDER
RECORDER IS IN NORMAL MODE WHEN PRESSING FRONT KEYS, THE RECORDER WILL RESPOND
CL 16532095_071.eps
150801

Figure 5-2

5.3 Virgin mode

If you want that the recorder starts up in Virgin mode, follow this procedure:

- Unplug the recorder
- plug the recorder again while you keep the STAND BY/ON key pressed
- the set starts up in Virgin mode.

5.4 Command Mode Interface

5.4.1 Nuclei Numeration

Each nucleus has a unique number of four digits. This number is the input of the command mode.

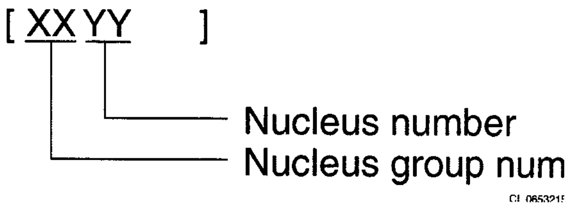

[XX YY]
Nucleus number
Nucleus group num

Figure 5-3

The following groups are defined for Digital Board Chrysalis:

Group number	Group name
0	Basic / Scripts
1	Chrysalis
2	Boot EEPROM
3	NVRAM
4	SDRAM
5	Flash
6	Video Input Processor
7	DVIO
8	Progressive Scan
9	Basic Engine
10	Display and Control Board
11	Analogue Board
12	System

5.4.2 Error Handling

Each nucleus returns an error code. This code contains six numerals, which means:

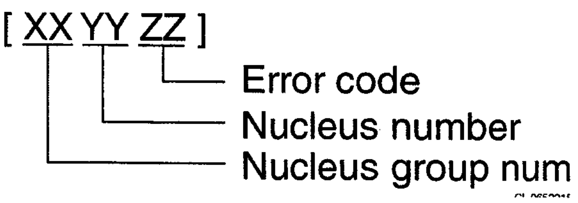

[XX YY ZZ]
Error code
Nucleus number
Nucleus group num

Figure 5-4

The nucleus group numbers and nucleus numbers are the same as above.

5.4.3 Command Mode Interface

Set-Up Physical Interface Components

Hardware required:

- Service PC
- one free COM port on the Service PC
- special cable to connect DVD recorder to Service PC

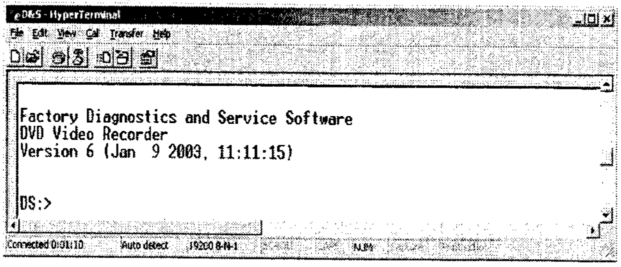
The service PC must have a terminal emulation program (e.g. Hyperterminal) installed and must have a free COM port (e.g. COM1). Activate the terminal emulation program and check that the port settings for the free COM port are: 19200 bps, 8 data bits, no parity, 1 stop bit and no flow control. The free COM port must be connected via a special cable to the RS232 port of the DVD recorder. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).

Code number of PC interface cable: 3122 785 90017

Activation Digital Board Chrysalis

1. Pull the mains cord from the recorder and reconnect it again (reboot).
2. The next welcome message will appear on the PC:

Startup screen


eD&S - HyperTerminal
File Edit View Call Transfer Help
Connected 0:01:10 Auto detect 19200 8-N-1 NUM

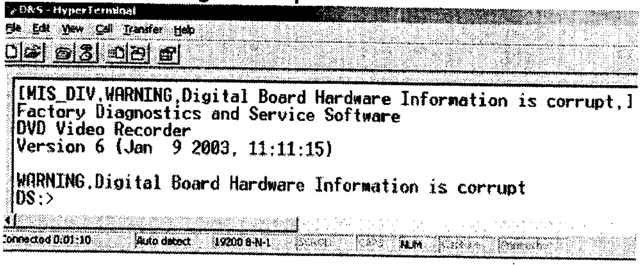
```
Factory Diagnostics and Service Software
DVD Video Recorder
Version 6 (Jan  9 2003, 11:11:15)

DS:>
```

Figure 5-5

Now, the prompt 'DS:>' will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei. If you see above shown screen, continue with paragraph 'Nuclei Codes'.

1. It is possible that the next messages will appear when starting the DVD+RW for the first time

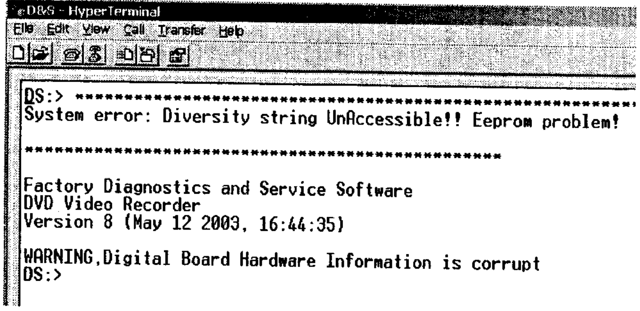
Error messages startup


D&S - HyperTerminal
File Edit View Call Transfer Help
Connected 0:01:10 Auto detect 19200 8-N-1 NUM

```
[MIS_DIV,WARNING,Digital Board Hardware Information is corrupt,]
Factory Diagnostics and Service Software
DVD Video Recorder
Version 6 (Jan  9 2003, 11:11:15)

WARNING,Digital Board Hardware Information is corrupt
DS:>
```

Figure 5-6

Error messages D&S program

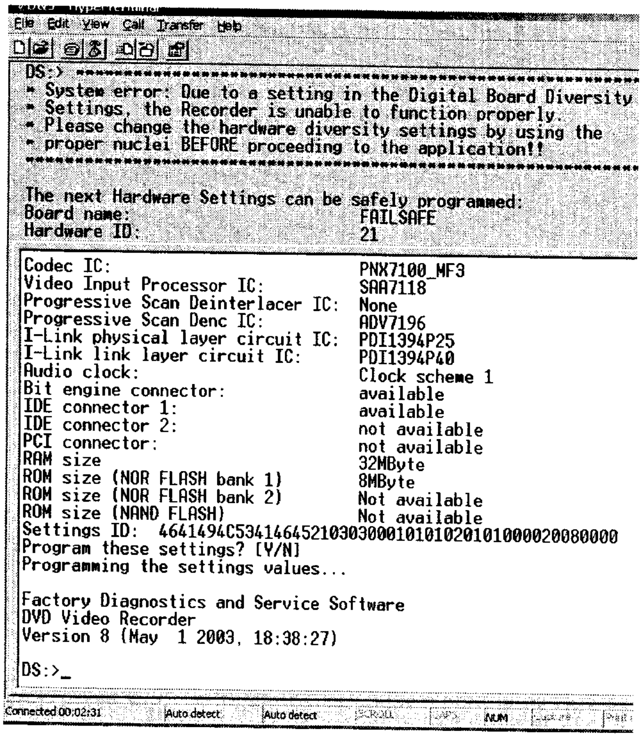

D&S - HyperTerminal
File Edit View Call Transfer Help

```
DS:> **********************************************************
System error: Diversity string UnAccessible!! Eeprom problem!

****************************************************

Factory Diagnostics and Service Software
DVD Video Recorder
Version 8 (May 12 2003, 16:44:35)

WARNING,Digital Board Hardware Information is corrupt
DS:>
```

Figure 5-7

In these cases, the boot EEPROM of the Chrysalis Digital Board does not contain the required string with the hardware information. To update the Digital Board with the correct string, nucleus 1226 must be executed. See next section 'Diversity String Input'.

There can also be the next error message.


File Edit View Call Transfer Help
Connected 00:02:31 Auto detect Auto detect NUM

```
DS:> ***************************************************************
* System error: Due to a setting in the Digital Board Diversity
* Settings, the Recorder is unable to function properly.
* Please change the hardware diversity settings by using the
* proper nuclei BEFORE proceeding to the application!!
****************************************************************

The next Hardware Settings can be safely programmed:
Board name:                             FAILSAFE
Hardware ID:                            21
Codec IC:                               PNX7100_MF3
Video Input Processor IC:               SAA7118
Progressive Scan Deinterlacer IC:       None
Progressive Scan Denc IC:               ADV7196
I-Link physical layer circuit IC:       PDI1394P25
I-Link link layer circuit IC:           PDI1394P40
Audio clock:                            Clock scheme 1
Bit engine connector:                   available
IDE connector 1:                        available
IDE connector 2:                        not available
PCI connector:                          not available
RAM size                                32MByte
ROM size (NOR FLASH bank 1)             8MByte
ROM size (NOR FLASH bank 2)             Not available
ROM size (NAND FLASH)                   Not available
Settings ID:  4641494C53414645210303000101010201010000020080000
Program these settings? [Y/N]
Programming the settings values...

Factory Diagnostics and Service Software
DVD Video Recorder
Version 8 (May  1 2003, 18:38:27)

DS:>_
```

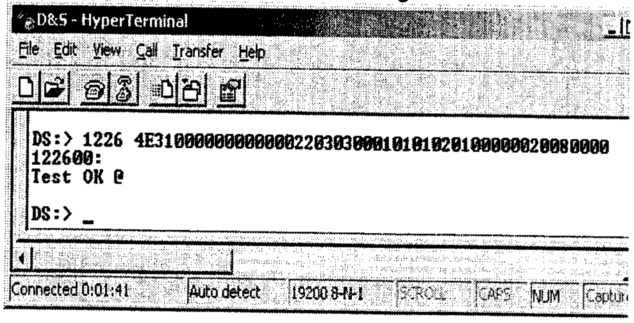
Figure 5-8

Enter "Y" to program a safe string. With this automatically generated string the board will work in principle but it has to be checked if all board settings were detected correctly.

Diversity String Input

1. Execute nucleus 1226 to enter the string. Please see adjustment instructions in chapter 8 for details

Nucleus 1226 execution with string

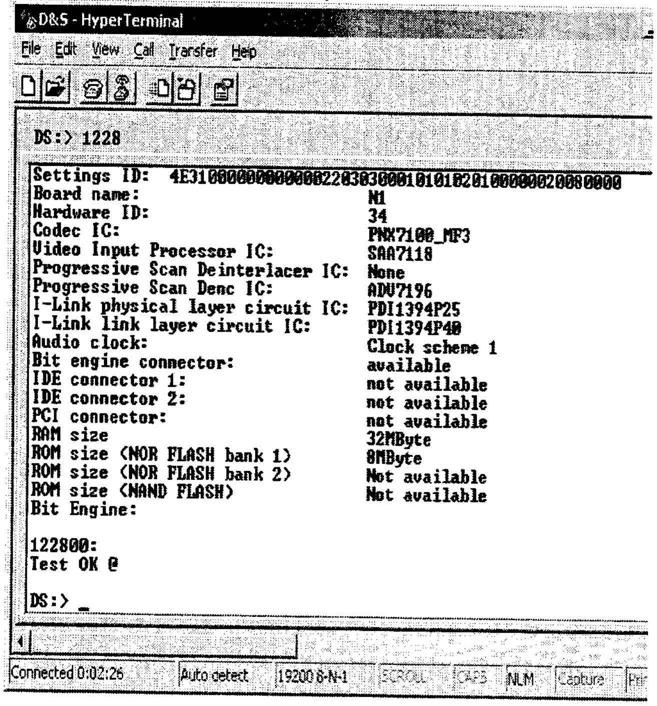

D&S - HyperTerminal
File Edit View Call Transfer Help
Connected 0:01:41 Auto detect 19200 8-N-1 SCROLL CAPS NUM Captur

```
DS:> 1226 4E3100000000000022030300010101020100000020080000
122600:
Test OK @

DS:> _
```

Figure 5-9

1. To check if the hardware info is filled correctly, you can execute nucleus 1228.

Nucleus 1228 info example


D&S - HyperTerminal
File Edit View Call Transfer Help
Connected 0:02:26 Auto detect 19200 8-N-1 SCROLL CAPS NUM Capture Prin

```
DS:> 1228

Settings ID:  4E3100000000000022030300010101020100000020080000
Board name:                             N1
Hardware ID:                            34
Codec IC:                               PNX7100_MF3
Video Input Processor IC:               SAA7118
Progressive Scan Deinterlacer IC:       None
Progressive Scan Denc IC:               ADV7196
I-Link physical layer circuit IC:       PDI1394P25
I-Link link layer circuit IC:           PDI1394P40
Audio clock:                            Clock scheme 1
Bit engine connector:                   available
IDE connector 1:                        not available
IDE connector 2:                        not available
PCI connector:                          not available
RAM size                                32MByte
ROM size (NOR FLASH bank 1)             8MByte
ROM size (NOR FLASH bank 2)             Not available
ROM size (NAND FLASH)                   Not available
Bit Engine:

122800:
Test OK @

DS:> _
```

Figure 5-10

1. Exit the 'Terminal' program.
1. Reboot the DVD recorder to allow the software to start.

Command overview Digital Board Chrysalis

Below you will find an overview of the nuclei, their numbers, and their error codes. This overview is preliminary and subject to modifications.

Chrysalis (CHR)

Nucleus Name	**DS_CHR_DevTypeGet**
Nucleus Number	100
Description	Sends the device ID and the module ids and revisions of the PNX7100 (Chrysalis) to the stdout port.
User Input	None
Example	See below

Example

```
DS:> 100
Device ID  7100
Codec ID   PNX7100_MF2
F-BCU  (0x0102) 1.0 INTC   (0x011d) 1.0 PCI-XIO(0x0113) 1.0
SIF(0x013b) 1.0 EJTAG  (0x0104) 0.0   S-BCU  (0x0102) 1.0
BOOT (0x010a) 1.0 CONFIG (0x013f) 1.0 RESET  (0x0123) 1.0
DEBUG  (0x0116) 0.0   UART0  (0x0107) 0.1   UART1  (0x0107) 0.1
UART2  (0x0107) 0.1   UART3  (0x0107) 0.1   I2C0   (0x0105) 0.1
I2C1   (0x0105) 0.1   GPIO   (0x013c) 1.0   SYNC   (0x013a) 1.0
DISP0  (0xa015) 0.1   DISP1  (0xa00f) 0.0   OSD    (0x0136) 0.1
SPU    (0xa00e) 0.0   MIXER  (0x0137) 1.0   DENC   (0x0138) 0.1
CCIR   (0x0139) 1.0   VDEC   (0x0133) 0.1   PARSER (0xa00d) 0.0
DV     (0xa00c) 0.0   BEI    (0xa00a) 0.0   IDE    (0xa009) 0.0
SGDX   (0xa008)0.0 BYTE   (0xa00b) 0.0   OUTPUT (0xa003) 0.0
ACOMP  (0xa000) 0.0   VFE    (0xa001) 0.0   VCOMP  (0xa002) 0.0
SCR    (0x0000) 0.0 SIFF   (0xa011) 0.0 WMD    (0xa010) 0.0
AUDIO0 (0xa015) 0.1 AUDIO1 (0xa00f) 0.0 PSCAN  (0xa018) 0.0

010000:
Test OK @
```

Nucleus Name	**DS_CHR_TestImageOn**
Nucleus Number	101
Description	Generates a test-image of a selected video standard on selected video output on the digital board. When no input is given, the default values will be used. Use nucleus **DS_ANAB_VideoRouting** to route the video signal on the analogue board output
User Input	The user has to decide which test image, video standard and video output must be used: **Test image id:** 0 VERTICAL_COLOURBAR (default) 1 HORIZONTAL_COLOURBAR 2 WHITE 3 YELLOW 4 CYAN 5 GREEN 6 MAGENTA 7 RED 8 BLUE 9 BLACK 10 GRAY **Video standard:** PAL (default) NTSC **Video output:** ALL CVBS and YC and RGB (default) CVBS YC RGB YUV PSCAN progressive scan
Example	See below

Example

```
DS:> 101
010100:
Test OK @
DS:> 101 0 pal cvbs
010100:
Test OK @
DS:> 101 4 ntsc yc
010100:
Test OK @
```

Nucleus Name	**DS_CHR_TestImageOff**
Nucleus Number	102
Description	Switches the test-image off.
User Input	None

Example	DS:> 102 010200: Test OK @

Nucleus Name	**DS_CHR_SineOn**
Nucleus Number	103
Description	Generate an audio sine signal on the audio output of the digital board. Note: Left channel
	6kHz, right channel 12 kHz sine. Make sure to route the signal first.
User Input	None
Example	DS:> 103 010300: Test OK @

Nucleus Name	**DS_CHR_SineOff**
Nucleus Number	104
Description	Stop generating the audio sine signal
User Input	None
Example	DS:> 104 010400: Test OK @

Nucleus Name	**DS_CHR_SineBurst**
Nucleus Number	105
Description	Generate an audio sine signal on the audio output of the digital board for 4 seconds.
	Note: Left channel 6kHz, right channel 12 kHz sine with some known hick-ups
User Input	None
Example	DS:> 105 010500: Test OK @

Nucleus Name	**DS_CHR_MuteOn**
Nucleus Number	106
Description	Mute the audio outputs of the digital board
User Input	None
Example	DS:> 106 010600: Test OK @

Nucleus Name	**DS_CHR_MuteOff**
Nucleus Number	107
Description	De-mute the audio outputs of the digital board
User Input	None
Example	DS:> 107 010700: Test OK @

Nucleus Name	**DS_CHR_DvLedOn**
Nucleus Number	108
Description	Check the connection to the DV-LED on the digital board by switching it on
User Input	None
Example	DS:> 108 010800: Test OK @

Nucleus Name	**DS_CHR_DvLedOff**
Nucleus Number	109
Description	Switch off the DV-LED on the digital board
User Input	None
Example	DS:> 109 010900: Test OK @

Nucleus Name	**DS_CHR_MacroVisionOn**
Nucleus Number	110
Description	Turn on MacroVision.
User Input	None
Example	DS:> 110 011000: Test OK @

Nucleus Name	**DS_CHR_MacroVisionOff**
Nucleus Number	111
Description	Turn off MacroVision.
User Input	None
Example	DS:> 111 011100: Test OK @

Nucleus Name	**DS_CHR_Peek**
Nucleus Number	112
Description	Peek a value on a specified address
User Input	The address to peek on
Example	DS:> 112 0xa0700000 011200: Value read = 0x000001BD Test OK @

Nucleus Name	**DS_CHR_Poke**
Nucleus Number	113
Description	Poke a value on a specified address
User Input	The address to poke and the value: <address><value>
Example	DS:> 113 0xa0700000 0xaabbccdd 011300: Test OK @

Nucleus Name	**DS_CHR_INT_PICInterrupts**
Nucleus Number	114
Description	Test all interrupts of the priority interrupt controller
User Input	-
Example	DS:> 114 011400: Test OK @

Nucleus Name	**DS_CHR_DMA_TestDMA**
Nucleus Number	115
Description	Test the memory to memory DMA transfer
User Input	-
Example	DS:> 115 011500: Test OK @

Boot EEPROM (BROM)

Nucleus Name	**DS_BROM_Communication**
Nucleus Number	200
Description	Check the communication between the IIC controller of the Chrysalis and the boot EEPROM
User Input	None
Example	DS:> 200 020000: Test OK @

Nucleus Name	**DS_BROM_WriteRead**
Nucleus Number	201
Description	Check whether the Boot EEPROM can be written to and read from
User Input	None

Example	DS:> 201 020100: Test OK @

NVRAM

Nucleus Name	**DS_NVRAM_Communication**
Nucleus Number	300
Description	Check the communication between the IIC controller of the Chrysalis and the EEPROM
User Input	None
Example	DS:> 300 030000: Test OK @

Nucleus Name	**DS_NVRAM_WriteRead**
Nucleus Number	301
Description	Check whether the EEPROM can be written to and read from
User Input	None
Example	DS:> 301 030100: Test OK @

Nucleus Name	**DS_NVRAM_Clear**
Nucleus Number	302
Description	Make the EEPROM empty, containing all zeroes.
User Input	None
Example	DS:> 302 030200: Test OK @

Nucleus Name	**DS_NVRAM_Modify**
Nucleus Number	303
Description	Modifies one or more locations in NVRAM and updates the checksum of the section modified
User Input	1. The location that must be modified i.e. "ALL" "BOOT" "DIAGNOSTICS" "DOWNLOAD" "CONFIG" "RECORDER" or no string if an offset from the base address of the NVRAM is required 2. The offset and data which to put on the selected location <offset> <length> <data>
Example	DS:> 303 DIAGNOSTICS 5 1 0x5a 030300:Section is modified successfully Test OK @

Nucleus Name	**DS_NVRAM_Read**
Nucleus Number	304
Description	Read out one or more locations in the NVRAM
User Input	1. The location which must be read i.e. "ALL" "BOOT" "DIAGNOSTICS" "DOWN LOAD" "CONFIG" "RECORDER" or no string if an offset from the base address of the NVRAM is required 2. The offset and number of bytes to read <offset> <length>
Example	304 DIAGNOSTICS 0 6 030400: Value read = 0x00 0x00 0x00 0x00 0x00 0x5A Test OK @

SDRAM

Nucleus Name	**DS_SDRAM_WriteRead**
Nucleus Number	400
Description	Check all data lines, address lines and memory locations of the SDRAM
User Input	None
Example	DS:> 400 040000: Test OK @

Nucleus Name	**DS_SDRAM_WriteReadFast**
Nucleus Number	401

Description	Check all data lines and address lines of the SDRAM
User Input	None
Example	DS:> 401 040100: Test OK @

Nucleus Name	**DS_SDRAM_Write**
Nucleus Number	402
Description	Write to a specific memory address
User Input	1. The location that must be modified (SDRAM starts at address 0xA0000000) 2. The value to put on the selected location
Example	DS:> 402 0xa1000010 0xad112222 040200: Test OK @

Nucleus Name	**DS_SDRAM_Read**
Nucleus Number	403
Description	Read from a specific memory address
User Input	The location from which the data must be read (SDRAM starts at address 0xA0000000)
Example	DS:> 403 0xa1000010 040300: Value read = 0xAD112222 Test OK @

FLASH

Nucleus Name	**DS_FLASH_DevTypeGet**
Nucleus Number	500
Description	Get the device (revision) type information of the FLASH IC. (manufacturer and device ID)
User Input	None
Example	DS:> 500 050000: Found FLASH memory: Manufacturer ID: 0x01 Device ID : 0x01 Test OK @

Nucleus Name	**DS_FLASH_WriteRead**
Nucleus Number	501
Description	Check whether the FLASH can be written to and read from
User Input	None
Example	DS:> 501 050100: Test OK @

Nucleus Name	**DS_FLASH_Read**
Nucleus Number	502
Description	Read from a specific memory address in FLASH
User Input	The location from which data must be read (FLASH starts at address 0xB8000000)
Example	DS:> 502 0xb8000000 050200: Value read = 0x3C08A000 Test OK @

Nucleus Name	**DS_FLASH_ChecksumProgram**
Nucleus Number	503
Description	Check the checksum of the application partitions by recalculating and comparing partition checksums
User Input	None
Example	DS:> 503 050300: BootCode checksum is: 0xBABE5B6F, which is correct Diagnostics checksum is : 0xBABEBAFF, which is correct Download checksum is: 0xBABEEDBF, which is correct Application checksum is : 0xBABE8EEC, which is correct Test OK @

Nucleus Name	**DS_FLASH_CalculateChecksum**
Nucleus Number	504
Description	Calculate the checksum over all memory addresses. Used to check entire FLASH contents
User Input	None
Example	DS:> 504 050400: The Checksum = 0xBABE30A4 Test OK @

Nucleus Name	**DS_FLASH_CalculateChecksumFast**
Nucleus Number	505
Description	Calculate a checksum over a selected number of address locations
User Input	None
Example	DS:> 505 050500: The Checksum = 0xBABEB064 Test OK @

Video Input Processor (VIP)

Nucleus Name	**DS_VIP_DevTypeGet**
Nucleus Number	600
Description	Get the device (revision) type information of the VIP IC
User Input	None
Example	DS:> 600 060000: Found SAA7118 Test OK @

Nucleus Name	**DS_VIP_Communication**
Nucleus Number	601
Description	Check the communication between the IIC controller of the chrysalis and the VIP IC
User Input	None
Example	DS:> 601 060100: Test OK @

Nucleus Name	**DS_VIP_ClockOutputOn**
Nucleus Number	602
Description	Switch the clock output on
User Input	None
Example	DS:> 602 060200: Test OK @

Nucleus Name	**DS_VIP_ClockOutputOff**
Nucleus Number	603
Description	Switch the clock output off
User Input	None
Example	DS:> 603 060300: Test OK @

Nucleus Name	**DS_VIP_SelectInput**
Nucleus Number	604
Description	Select an input video path to be switched to the analogue output pin (AOUT) of the VIP
User Input	The input to select, see table below. 1 CVBS_Y_IN_A 2 CVBS_OUT_B 3 CVBS_Y_IN_B 4 CVBS_Y_IN_C 6 C_IN 8 G_IN 9 Y_IN 13 B_IN 14 U_IN 18 R_IN 19 V_IN

Example	DS:> 604 1 060400: Test OK @

Digital Video Input Output (DVIO)

Nucleus Name	**DS_DVIO_LinkDevTypeGet**
Nucleus Number	700
Description	Get the device (revision) type information of the 1394 Link layer IC
User Input	None
Example	DS:> 700 070000: Device type of the link layer IC: ffc00301 Test OK @

Nucleus Name	**DS_DVIO_PhyDevTypeGet**
Nucleus Number	701
Description	Get the device (revision) type information of the 1394 Physical layer IC
User Input	None
Example	DS:> 701 070100: Device type of the phy layer IC: 0 Test OK @

Nucleus Name	**DS_DVIO_LinkCommunication**
Nucleus Number	702
Description	Check the accessibility of the 1394 Link layer IC by writing to and reading from a specific address
User Input	None
Example	DS:> 702 070200: Test OK @

Nucleus Name	**DS_DVIO_PhyCommunication**
Nucleus Number	703
Description	Check the accessibility of the 1394 Physical layer IC by writing to and reading from a specific address
User Input	None
Example	DS:> 703 070300: Test OK @

Nucleus Name	**DS_DVIO_Routing**
Nucleus Number	704
Description	Route a DV stream containing an audio and video signal through the physical and link layer ICs to the Chrysalis
User Input	None, test works for both NTSC and PAL
Example	DS:> 704 070400: Test OK @

Nucleus Name	**DS_DVIO_DetectNode**
Nucleus Number	705
Description	Check whether a DV node can be detected by the hardware
User Input	None, test works for both NTSC and PAL
Example	DS:> 705 070500: Test OK @

Nucleus Name	**DS_DVIO_DetectStream**
Nucleus Number	706
Description	Check whether a DV stream can be detected by the hardware
User Input	None, test works for both NTSC and PAL
Example	DS:> 706 070600: Test OK @

Progressive Scan (PSCAN)

Nucleus Name	**DS_PSCAN_CommunicationDenc**
Nucleus Number	801
Description	Check the communication between the IIC controller of the chrysalis and the progressive scan DENC-IC
User Input	None
Example	DS:> 801 080100: Test OK @

Nucleus Name	**DS_PSCAN_TestImageOn**
Nucleus Number	802
Description	Generate the test images that are present on the progressive scan IC.
User Input	In case of ADV7196: When no input is given "HATCH" is the default -"HATCH" -"FRAME" Remark: "HATCH" is a crosshatch test pattern (horizontal and vertical white lines are displayed against a black background) "FRAME" is a uniform coloured frame/field test pattern (default white). In case of FLI2300: Nothing.
Example	DS:> 802 HATCH 080200: Test OK @

Nucleus Name	**DS_PSCAN_TestImageOff**
Nucleus Number	803
Description	Switch off the generated test image
User Input	None
Example	DS:> 803 080300: Test OK @

Nucleus Name	**DS_PSCAN_TestImageColourSettingsSet**
Nucleus Number	804
Description	Set the colour of the hatch- or the frame- field to a different value than the default white
User Input	A colour string of one of the next non-case sensitive strings (WHITE, BLACK, RED, GREEN, BLUE, YELLOW, CYAN, MAGENTA) or Y Cr Cb (hexa-) decimal values.
Example	DS:> 804 yellow 080400: Test OK @ DS:> 804 0x6a 0xde 0xca 080400: Test OK @

Nucleus Name	**DS_PSCAN_TestImageColourSettingsGet**
Nucleus Number	805
Description	Get the colour settings of the hatch- or the frame- field.
User Input	None
Example	DS:> 805 080500: Colour Y Cr Cb values: 0xD2 0x92 0x10 Test OK @

Nucleus Name	**DS_PSCAN_Routing**
Nucleus Number	806
Description	Route a video signal from the host processor through the progressive scan ICs to the progressive scan output of the set. Note: to route the progressive scan to the output of the set, first call nucleus 1112 with parameter 0 (video routing on analogue board).
User Input	None
Example	DS:> 806 080600: Test OK @

Nucleus Name	**DS_PSCAN_DevTypeGetDeinterlacer**
Nucleus Number	807
Description	Get the device (revision) type information of the progressive scan deinterlacer.
User Input	None
Example	DS:> 807 080700: Chip name : 2300 Chip version : 1 Test OK @

Nucleus Name	**DS_PSCAN_CommunicationDeinterlacer**
Nucleus Number	808
Description	Check the communication between the IIC controller of the chrysalis and the progressive scan Deinterlacer-IC
User Input	None
Example	DS:> 808 080800: Test OK @

Basic Engine (BE)

Nucleus Name	**DS_BE_CommunicationEcho**
Nucleus Number	900
Description	Check the communication between the digital board and the basic engine by issuing an echo command over the S2B interface
User Input	None
Example	DS:> 900 090000: Test OK @

Nucleus Name	**DS_BE_Reset**
Nucleus Number	901
Description	Reset the basic engine
User Input	None
Example	DS:> 901 090100: Test OK @

Nucleus Name	**DS_BE_VersionGet**
Nucleus Number	903
Description	Get the version of the basic engine and that of the optical unit
User Input	None
Example	DS:> 903 090300: BE version = 20.09.18 Optical unit version = 3C.00.09.41.08 Test OK @

Nucleus Name	**DS_BE_GetSelftestResult**
Nucleus Number	902
Description	Return the self-test results through the service port
User Input	None
Example	DS:> 902 090200: Test OK @

Nucleus Name	**DS_BE_TrayOut**
Nucleus Number	904
Description	Open the tray of the basic engine
User Input	None
Example	DS:> 904 090400: Test OK @

Nucleus Name	**DS_BE_TrayIn**
Nucleus Number	905
Description	Close the tray of the basic engine

User Input	None
Example	DS:> 905 090500: Test OK @

Nucleus Name	**DS_BE_WriteReadDvdRw**
Nucleus Number	906
Description	Write data to and read data from a DVD+RW disc through the basic engine for verification of the writing
User Input	None
Example	DS:> 906 090600: Testing on sector 0x5dbe0: OK Test OK @

Nucleus Name	**DS_BE_WriteReadDvdR**
Nucleus Number	907
Description	Write data to and read data from a DVD+R disc through the basic engine for verification of the writing
User Input	None
Example	DS:> 907 090700: Testing on sector 0x36210: OK Test OK @

Nucleus Name	**DS_BE_StatisticalInformationGet**
Nucleus Number	908
Description	Retrieve the statistical information from the basic engine
User Input	None
Example	DS:> 908 Total time the power power on (HR:MIN) 0: 0h Total time of reading CDROM discs (HR:MIN) 0: 0h Total time of reading high DVD SL discs (HR:MIN) 0: 0h Total time of reading other DVD SL discs (HR:MIN) 0: 0h Total time of reading high DVD DL siscs (HR:MIN) 0: 0h Total time of reading other DVD DL discs (HR:MIN) 0: 0h Total time of reading high DVD+R discs (HR:MIN) 0: 0h Total time of reading other DVD+R discs (HR:MIN) 0: 0h Total time of reading high DVD+RW discs (HR:MIN) 0: 0h Total time of reading other DVD+RW discs (HR:MIN) 1: 0h Total time of writing DVD+R discs in 2HRS mode (HR:MIN) 0: 0h Total time of writing DVD+R discs in 4HRS mode (HR:MIN) 0: 0h Total time of writing DVD+R discs in 6HRS mode (HR:MIN) 0: 2h Total time of writing DVD+RW discs in 2HRS mode (HR:MIN) 0: 0h Total time of writing DVD+RW discs in 4HRS mode (HR:MIN) 0: 3h Total time of writing DVD+RW discs in 6HRS mode (HR:MIN) 0: 0h 090800: Test OK @

Nucleus Name	**DS_BE_StatisticalInformationReSet**
Nucleus Number	909
Description	Reset the statistical information in the basic engine
User Input	None
Example	DS:> 909 090900: Test OK @

Nucleus Name	**DS_BE_ErrorLogGet**
Nucleus Number	910
Description	Get the error log from the basic engine
User Input	None
Example	DS:> 910 Momentary errors (0-9): 0x21 0x00 0x00 0x20 0x00 0x00 0x00 0x00 0x00 0x00 Cumulative errors (1-9): 0x00 0x80 0x20 0x00 0x00 0x00 0x00 0x00 0x00 Software fatal assert : 256 cpowermanager.cpp 091000: Test OK @

Nucleus Name	**DS_BE_ErrorLogReset**
Nucleus Number	911
Description	Reset the error log in the basic engine
User Input	None
Example	DS:> 911 091100: Test OK @

Nucleus Name	DS_BE_JitterOptimise
Nucleus Number	912
Description	Perform jitter optimisation:A formatted DVD must be loaded into the engine before executing this nucleus
User Input	none
Example	DS:> 912 Test OK @

Nucleus Name	**DS_BE_FocusOn**
Nucleus Number	913
Description	Put the laser of the BE into focus
User Input	None
Example	DS:> 913 091300: Test OK @

Nucleus Name	**DS_BE_FocusOff**
Nucleus Number	914
Description	Turn off putting the laser of the BE into focus
User Input	None
Example	DS:> 914 091400: Test OK @

Nucleus Name	**DS_BE_MotorOn**
Nucleus Number	915
Description	Turn on the turntable motor
User Input	None
Example	DS:> 915 091500: Test OK @

Nucleus Name	**DS_BE_MotorOff**
Nucleus Number	916
Description	Turn off the turntable motor
User Input	None
Example	DS:> 916 091600: Test OK @

Nucleus Name	**DS_BE_RadialOn**
Nucleus Number	917
Description	Close the radial loop
User Input	A formatted DVD must be loaded into the engine before executing this nucleus
Example	DS:> 917 091700: Test OK @

Nucleus Name	**DS_BE_RadialOff**
Nucleus Number	918
Description	Open the radial loop
User Input	None
Example	DS:> 918 091800: Test OK @

Nucleus Name	**DS_BE_RadialCalibration**
Nucleus Number	919
Description	Calibrate the radial loop
User Input	A formatted DVD must be loaded into the engine before executing this nucleus
Example	DS:> 919 091900: Test OK @

Nucleus Name	**DS_BE_Tilt**
Nucleus Number	920
Description	Test the tilt mechanism control loop, or allow its proper functioning to be measured.Before executing this nucleus a disc must be loaded into the recorder
User Input	None
Example	DS:> 920 092000: Tilt sensor bathtub: (71,-12,145)(68,-12,135)(62,-10,120)(56,-92,97)(50,-75,86) (44,-59,80)(41,-52,80)(35,-37,86)(29,-22,86) (23,-7,92)(17,8,111)(11,23,135)(8,31,138)(5,39,158) Test OK @

Nucleus Name	**DS_BE_CheckDisc**
Nucleus Number	921
Description	Check whether there is a disc inside the BE
User Input	None
Example	DS:> 921 092100: A DVD+Rewritable is loaded (disc is empty or partially recorded) Test OK @ DS:> 921 092100: No Disc is loaded Test OK @

Nucleus Name	**DS_BE_SledgeMotor**
Nucleus Number	922
Description	Send the sledge to its home position, then to the middle of the disc, and then to the end.
User Input	None
Example	DS:> 922 092200: Test OK @

Nucleus Name	**DS_BE_ReadTocInfo**
Nucleus Number	924
Description	Read the TOC from the disc. This gives a good indication if the BE works properly..
User Input	None
Example	DS:> 924 092400: TOC info [hex] = 91 3A 0C Test OK@ DS:> 924 092403: The BE returned: 0x10 #{no_disc_error} No disc is detected Error@ DS:> 924 092403: The BE returned: 0x1e #{illegal_medium_error} Engine unable to handle current disc. Probably illegal medium. Error @

Nucleus Name	**DS_BE_DiscErase**
Nucleus Number	925
Description	Perform a DC-erase on a DVD+RW disc.
User Input	None

Example	DS:> 925 The entirely disc will be erased. Are you sure you want this?[y/n] 092500: Test OK @

Nucleus Name	**DS_BE_RegionCodeSet**
Nucleus Number	928
Description	Set the region code in the AV3.
User Input	Region code
Example	DS:> 928 1 092800: Test OK @ DS:> 928 This nucleus is not supported by the engine 092800: Test OK @

Nucleus Name	**DS_BE_RegionCodeGet**
Nucleus Number	929
Description	Read the region code from the AV3.
User Input	None
Example	DS:> 929 092900: DVD region 1 Test OK @ DS:> 929This nucleus is not supported by the engine 092900: Test OK @

Nucleus Name	**DS_BE_RegionCounterReset**
Nucleus Number	930
Description	Reset the region counter in the AV3.
User Input	None
Example	DS:> 930 093000: Test OK @ DS:> 930 This nucleus is not supported by the engine 093000: Test OK @

Nucleus Name	**DS_BE_AdjustLaserControl**
Nucleus Number	931
Description	Adjust the DVD-M (with the OPU) with PCBA. (So adjusts the two PCBS to each other)
User Input	None
Execution Time	30 seconds
Example	DS:> 931 093100: Test OK @

Display and Control Board (DCB)

Nucleus Name	**DS_DCB_CommunicationEcho**
Nucleus Number	1000
Description	Check the communication between the digital board and the DCB by issuing an echo command
User Input	None
Example	DS:> 1000 100000: Test OK @

Nucleus Name	**DS_DCB_VersionGet**
Nucleus Number	1001
Description	Get the version of the DCB

User Input	None
Example	DS:> 1001100100: DCB version: 13Test OK @

Nucleus Name	**DS_DCB_LightDisplay**
Nucleus Number	1002
Description	Light the entire display of the DCB, and clear the display after confirmation.User confirmation is necessary.
User Input	None
Example	DS:> 1002 100200: Test OK @

Nucleus Name	**DS_DCB_Keyboard**
Nucleus Number	1004
Description	Check all keys of the keyboard by confirming the key-code displayed of each key.
User Input	None
Example	DS:> 1004 100400: Test OK @

Nucleus Name	**DS_DCB_RemoteControl**
Nucleus Number	1005
Description	Check the interface between the remote control and the DCB by checking the key-code displayed
User Input	None
Example	DS:> 1005 100500: Test OK @

Nucleus Name	**DS_DCB_Led**
Nucleus Number	1006
Description	Switch the record LED on, and after confirmation off. The user confirms by pressing the REC key, STOP key, or the PLAY key on the local keyboard. The PLAY key confirms that the LED is on and the REC key
User Input	None
Example	DS:> 1006 100600: Test OK @

Analogue Board (ANAB)

Nucleus Name	**DS_ANAB_CommunicationEcho**
Nucleus Number	1100
Description	Check the communication between the digital board and the analogue board by issuing some echo string.
User Input	None
Example	DS:> 1100 110000: Hello Analogue Board Test OK @

Nucleus Name	**DS_ANAB_CommunicationIicNvram**
Nucleus Number	1101
Description	Check the communication between the digital board and the NVRAM on the analogue board.
User Input	None
Example	DS:> 1101 110100: Test OK @

Nucleus Name	**DS_ANAB_CommunicationIicTuner**
Nucleus Number	1102
Description	Check the communication between the digital board and the tuner on the analogue board
User Input	None

Example	DS:> 1102 110200: Test OK @

Nucleus Name	**DS_ANAB_CommunicationIicDataSlicer**
Nucleus Number	1103
Description	Check the communication between the digital board and the data slicer on the analogue board
User Input	None
Example	DS:> 1103 110300: Test OK @

Nucleus Name	**DS_ANAB_CommunicationIicSoundProcessor**
Nucleus Number	1104
Description	Check the communication between the digital board and the sound processor on the analogue board
User Input	None
Example	DS:> 1104 110400: Test OK @

Nucleus Name	**DS_ANAB_CommunicationIicAVSelector**
Nucleus Number	1105
Description	Check the communication between the digital board and the A/V-selector on the analogue board
User Input	None
Example	DS:> 1105 110500: Test OK @

Nucleus Name	**DS_ANAB_HardwareVersionGet**
Nucleus Number	1106
Description	Get the hardware version of the analogue board
User Input	None
Example	DS:> 1106 110600: Analogue hardware version : 11 Test OK @

Nucleus Name	**DS_ANAB_SoftwareVersionBootGet**
Nucleus Number	1107
Description	Get the software version of the boot software of the analogue board
User Input	None
Example	DS:> 1107 110700: Bootcode application version : 11.00.11 Test OK @

Nucleus Name	**DS_ANAB_SoftwareVersionDownloadGet**
Nucleus Number	1108
Description	Get the software version of the download software of the analogue board
User Input	None
Example	DS:> 1108 110800: Download application version : 11.00.06 Test OK @

Nucleus Name	**DS_ANAB_SoftwareVersionApplGet**
Nucleus Number	1109
Description	Get the software version of the application software of the analogue board
User Input	None
Example	DS:> 1109 110900: Recorder application version : 11.00.23 Test OK @

Nucleus Name	**DS_ANAB_SoftwareVersionDiagnosticsGet**
Nucleus Number	1110
Description	Get the software version of the diagnostic software of the analogue board
User Input	None
Example	DS:> 1110 111000: Diagnostics application version : 11.00.13 Test OK @

Nucleus Name	**DS_ANAB_ChecksumProgram**
Nucleus Number	1111
Description	Check the checksum of the several partitions by recalculating and comparing partition checksums
User Input	None
Example	DS:> 1111 BootCode checksum is: 0xBABE6240, which is correct Diagnostics checksum is : 0xBABEBEAD, which is correct Download checksum is: 0xBABEA6B7, which is correct Application checksum is : 0xBABEB277, which is correct 111100: Test OK @

Nucleus Name	**DS_ANAB_VideoRouting**
Nucleus Number	1112
Description	Perform the routing of the video paths on the analogue board
User Input	The user has to input the correct parameter for the routing (see table 'video routing' below).
Example	DS:> 1112 00111200: Test OK @

Video routing paths (Europe)

Path ID	Description
0	Input signal is VIDEO(CVBS) from digital board and will be re-routed back to the digital board.
1	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board.
2	No Routing.
3	Input signal is from FRONT S-VIDEO(Y/C) and will be routed to the digital board.
4	No Routing.
5	Input signal is CVBS from SCART1 and will be routed to the digital board.
6	Input signal is CVBS from SCART2 and will be routed to the digital board.
7	Input Signal is CVBS from Digital Board and it will be routed to Scart1 and Scart2.
8	Input signal is VIDEO(CVBS) from ANTENNA IN and will be routed to SCART2.
9	Input signal is VIDEO(CVBS) from SCART1 and will be routed to SCART2.
10	Input signal is VIDEO(CVBS) from SCART2 and will be routed to SCART1.
11	Signal path is routed Fast Blank from Scart2 pin16 and will be routed SCART1 pin16
12	Input Signal is YC from Digital Board and it will be routed to SCART1.
13	
14	No Routing.
15	Input Signal is CVBS from TUNER and it will be routed to Digital .
16	No Routing.
17	Input Signal is routed from digital board YC to REAR S-VIDEO(YC) OUT
18	Signal path is routed from digital board RGB to RGB SCART1 and from digital board CVBS to digital board CVBS.
19	No Routing.
20	Input RGB Signal is routed from Digital Board to SCART1(RGB),Input CVBS Signal from Digital Board to Digital Board and Fast Blanking Signal from SCART2 to SCART1.
21	Input Y/C Signal from Digital Board is routed to Rear Y/C Connector and Input Y/C Signal from Front Y/C connector is routed to Digital Board.

Video routing paths (NAFTA)

Path ID	Description
0	No Routing.
1	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board.This routing is same as the above path id.

2	Input signal is from REAR VIDEO(CVBS) IN and will be routed to the digital board.
3	Input signal is from FRONT S-VIDEO(Y/C) IN and the signal received will be routed to the digital board.
4	Input signal is from REAR S-VIDEO(Y/C) IN and will be routed to the digital board.
5	No Routing.
6	No routing.
7	No routing.
8	Input signal is VIDEO(CVBS) from TUNER and will be routed to Y Pin of Rear Y/C Connector.This will give only black/White Picture .
9	Input signal is from YUV IN and will be routed to YUV OUT.This is possible only if Digital Board routes back YUV signal received back to the Analogue board(DENC)
10	No routing.
11	No routing.
12	No Routing.
13	No Routing.
14	No Routing.
15	Input CVBS Signal from Tuner is routed to Digital Board..
16	No Routing.
17	No Routing.
18	Input Signal from CVBS Rear In is routed to Digital Board. This is the same as path ID 02.
19	Input Y/C signal from Digital Board is routed to Y/C Rear Out Connector and Input signal from Y/C Front In Connector is routed to Y/C Digital Board.
20	Y/C signal from Digital Board is routed to Y/C Rear Out Connector and Input signal from Y/C Rear In Connector is routed to Y/C Digital Board.
23	The Video signal received from the Digital board will be output on Modulator channel 3.
24	The Video signal received from the Digital board will be output on Modulator channel 4.

Nucleus Name	**DS_ANAB_AudioRouting**
Nucleus Number	1113
Description	Perform the routing of the audio paths on the analogue board
User Input	The user has to input the correct parameter for the routing (see table 'audio routing' below)
Example	DS:> 1113 00111300: Test OK @

Audio routing paths (Europe)

Path ID	Description
0	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
1	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
2	No Routing.
3	Input signal is AUDIO from SCART1 and will be routed to the digital board.
4	Input signal is AUDIO from SCART2 and will be routed to the digital board.
5	No routing.
6	No routing.
7	Input Audio signal is from the digital Board and it will be routed to the SCART1 and SCART2
8	Input AUDIO signal from TUNER and will be routed to SCART2.
9	Input signal is AUDIO from SCART1 and will be routed to SCART2.
10	Input audio signal from SCART2 is routed to SCART1.
11	Input Audio signal is routed from DVIO to SCART2.
12	
13	No Routing.
14	Input is Audio Signal from DVIO and it will be routed to Digital Board.
15	Input is Audio Signal from TUNER and it will be routed to Digital Board..
16	No routing.
17	No Routing.
18	Input signal is from FRONT AUDIO IN and will be routed to SCART2.
21	Input signal is from FRONT AUDIO IN and will be routed to the digital board.

Audio routing paths (NAFTA)

Path ID	Description
0	No Routing.
1	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
2	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.

3	Input Audio Signal is routed from FRONT Cinch In to Digital Board.(This is same as path ID 01)
4	Input Signal is from Rear Cinch In1 and it will be routed to Digital Board..
5	No routing.
6	No routing.
7	No routing.
8	No Routing.
9	No routing.
10	No Routing.
11	No Routing.
12	No Routing.
13	Input Signal is from Digital Board and it will be routed to the digital board.
14	No routing.
15	Input is Audio Signal from TUNER and it will be routed to Digital Board.
16	Input signal is AUDIO from dvio board and will be routed to Digital Board.
17	No routing.
18	No routing.
19	No routing.
20	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.
21	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
22	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
23	The Audio signal received from the Digital board will be outputted on Modulator channel 3.
24	The Audio signal received from the Digital board will be outputted on Modulator channel 4.

<table>
<tr><td>Nucleus Name</td><td colspan="3">DS_ANAB_SelectTunerChannel</td></tr>
<tr><td>Nucleus Number</td><td colspan="3">1114</td></tr>
<tr><td>Description</td><td colspan="3">Set the tuner to receive a valid audio and video signal</td></tr>
<tr><td rowspan="9">User Input</td><td colspan="3"><Frequency*16> <video standard id>Tuner frequency: to tune the tuner to e.g. 216 MHz, this parameter must be 3456. (Since 216*16 = 3456. This is to avoid the decimal points to the parameter list.)Video standard id: The table below shows which video standards are possible</td></tr>
<tr><td>Video standard id</td><td>Europe</td><td>NAFTA</td></tr>
<tr><td rowspan="7">163248648096112</td><td>PAL_BG</td><td>NTSC</td></tr>
<tr><td>PAL_I</td><td>Invalid</td></tr>
<tr><td>PAL_DK</td><td>Invalid</td></tr>
<tr><td>SEC_L</td><td>Invalid</td></tr>
<tr><td>SEC_LS</td><td>Invalid</td></tr>
<tr><td>SEC_BG</td><td>Invalid</td></tr>
<tr><td>SEC_DK</td><td>Invalid</td></tr>
<tr><td>Example</td><td colspan="3">DS:> 1114 3456 16
111400:
Test OK @</td></tr>
</table>

Nucleus Name	**DS_ANAB_IICWriteRead**
Nucleus Number	1115
Description	Perform an IIC write and read action on the analogue board
User Input	Writing: [<W>|<w>] [I2C address] [number of data bytes to write] with <data[0]...data[n]> Max 16 data bytes (n < 16). Reading: [<R>|<r>] [I2C address] [number of data bytes to read] Max 16 data bytes (n < 16).
Example	DS:> 1115 w 0x94 2 0x06 0x02 111500: Test OK @

Nucleus Name	**DS_ANAB_ClockAdjust**
Nucleus Number	1116
Description	Set the clock to the value passed through in the YYYY MM DD HH MM SS format
User Input	<YYYY> <MM> <DD> <HH> <MM> <SS>
Example	DS:> 1116 2002 11 11 11 11 11 111600: Test OK @

Nucleus Name	**DS_ANAB_ClockReference**
Nucleus Number	1117
Description	Generate a 1 kHz signal on pin 7 (INT) of the clock IC
User Input	None
Example	DS:> 1117 111700: Test OK @

Nucleus Name	**DS_ANAB_ClockCorrection**
Nucleus Number	1118
Description	Store the clock IC correction value in NVRAM
User Input	The correction value for the clock
Example	DS:> 1118 1000023 111800: Test OK @

Nucleus Name	**DS_ANAB_TunerAFCReferenceVoltage**
Nucleus Number	1119
Description	Store the reference voltage for the tuner in NVRAM
User Input	The reference voltage, between 0 and 255
Example	DS:> 1119 5111900: Test OK @

Nucleus Name	**DS_ANAB_TunerFrequencyDownload**
Nucleus Number	1120
Description	Store the frequency table in NVRAM. The frequency table is passed through the error-string provided to the nucleus.
User Input	See frequency table
Example	DS:> 1120 2233 00 02 4E45442031 112000: Test OK @

Nucleus Name	**DS_ANAB_StoreExternalPresets**
Nucleus Number	1121
Description	Store the external presets in NVRAM
User Input	None
Example	DS:> 1121 112100: Test OK @

Nucleus Name	**DS_ANAB_BargraphLevelAdjust**
Nucleus Number	1122
Description	Measure the audio signal corresponding to 0dB per channel and store it as correction value in NVRAM
User Input	none
Example	DS:> 1122 112200: Test OK @

Frequency download string format

Format	description	remarks
X(XXX)	Preset number	
VVWW	VV: Channel numberWW : Channel offset	

ZZ	Byte containing 8 bit fields for TRUE/FALSE : BIT 0: Decoder BIT 1: Modulation BIT 2: NICAM SAP BIT 3: Satpreset BIT 4: Presetdefined Channelpreferred BIT 5: ExtPreset BIT 6: NameManuallyChanged BIT 7: ChannelPreset	NICAM/stereo bit for Europe SAP/stereo bit for NAFTA Preset defined bit is only used for Europe. For NAFTA, renamed as channelpreferred to indicate if a channel is preferred or not. TRUE if preset is defined from P50 as extern [TGA]
HH	HfSystemFineTuning	HfS: 4 bit, FT: -4,...,4
IIJJKKLLMM	Netname	Range: A,..,Z,0,..,9,_,.. Netname length exists for Europe only. 'II' is the HEX-value for the first character, 'JJ' for the second, Ö
The message string of (DS_MessageDef *msgString) should be in the format: "X(XXX)_VVWW_ZZ_HH_IIJJKKLLMM". Here will be 'X(XXX)' a decimal value in the range of 0 to 255. V, W, Z, H, I, J, K, L, M are hex values with out the prefix '0x' (in the range 0... 9,A ... F) " _" Denotes a space character. Remarks: CHANNEL_SYSTEM is for NAFTA. PRESET_SYSTEM is for Europe.		

System (SYS)

Nucleus Name	**DS_SYS_HardwareVersionGet**
Nucleus Number	1200
Description	Get the hardware version and type of the digital board
User Input	None
Example	DS:> 1200 120000: Hardware ID = 00 The (PIO-pins) Digital Board ID = 2 Test OK @ DS:>

Nucleus Name	**DS_SYS_SoftwareVersionBootGet**
Nucleus Number	1201
Description	Get the version of the boot software on the digital board
User Input	None
Example	DS:> 1201 120100: Software Boot Version = 0001T est OK @

Nucleus Name	**DS_SYS_SoftwareVersionDownloadGet**
Nucleus Number	1202
Description	Get the version of the download software on the digital board
User Input	None
Example	DS:> 1202 120200: Software Download Version = 0001 Test OK @

Nucleus Name	**DS_SYS_SoftwareVersionApplGet**
Nucleus Number	1203
Description	Get the version of the application software on the digital board
User Input	None
Example	DS:> 1203 120300: Software Application Version = 0001 Test OK @

Nucleus Name	**DS_SYS_SoftwareVersionDiagnosticsGet**
Nucleus Number	1204
Description	Get the version of the diagnostics software on the digital board
User Input	None

Example	DS:> 1204 120400: Software Diagnostics Version = 0001 Test OK @

Nucleus Name	**DS_SYS_EepromUpload**	
Nucleus Number	1205	
Description	Upload the contents of the NVRAM on the analogue board or the digital board to the service PC, by using the X-modem protocol	
User Input	Choose one of the following parameters for the nucleus:1. Upload the contents of the NVRAM of the digital board2. Upload the contents of the NVRAM of the analogue boardChoose in the terminal on the control PC -> transfer -> receive file. Select X-modem protocol. Then click receive in the dialogue and fill in the file name in which you want to store the data.	
	120503	Something went wrong while transferring the data.
	120504	User cancelled the upload.
Example	DS:> 1205 1120500: Test OK @	

Nucleus Name	**DS_SYS_EepromDownload**
Nucleus Number	1206
Description	Download a file with the contents of the NVRAM for the analogue board or the digital board from the service PC to the recorder, by using the X-modem protocol
User Input	Choose one of the following parameters for the nucleus:1. Download the contents of the NVRAM of the digital board2. Download the contents of the NVRAM of the analogue boardChoose in the terminal of the control PC -> transfer -> send file. Select X-modem protocol. Then choose a file with the Browse button in the dialogue and click on send.
Example	DS:> 1206 1120600: Test OK @

Nucleus Name	**DS_SYS_DvIdNumberSet**
Nucleus Number	1207
Description	Set the IEEE 1394 unique IDThe unique ID to be set.
User Input	None
Example	DS:> 1207 1234567890 120700: Test OK @

Nucleus Name	**DS_SYS_DvIdNumberGet**
Nucleus Number	1208
Description	Get the IEEE1394 ID
User Input	None
Example	DS:> 1208 120800: The DvIdNumber is: 0x0C22384E5A Test OK @

Nucleus Name	**DS_SYS_IicWrite**
Nucleus Number	1209
Description	Perform an IIC write action on the digital board
User Input	The user input the number of bytes to write followed by these bytes: <BusID><Slave address to write to><number of bytes to write><d1><d2><..><dx> Where the bus ID is either 0 (normally used) or 1
Example	DS:> 1209 0 0xa0 1 0x6 120900: 1 Bytes written Test OK @

Nucleus Name	**DS_SYS_IicRead**
Nucleus Number	1210
Description	Perform an IIC read action on the digital board
User Input	The user inputs the number of bytes to read and the address to read them from: <BusID><Slave address to read from><Number of bytes to read>Where the bus ID is either 0 (normally used) or 1

Example	DS:> 1210 0 0xa0 1 121000: Value read =0x06T est OK @

Nucleus Name	**DS_SYS_UartWrite**
Nucleus Number	1211
Description	Perform an UART write action on the digital board on a specified UART
User Input	The user inputs the UART to write to, the number of bytes and the bytes to be written to the UART. 1=UART port 1 : not used 2=UART port 2 : Bit Engine 3=UART port 3 : Analogue board <UartNr><Number of bytes to write><d1><d2><..><dx>
Example	DS:> 1211 2 2 0xd1 0x01 121100: Test OK @

Nucleus Name	**DS_SYS_UartRead**
Nucleus Number	1212
Description	Perform an UART read action on the digital board on a specified UART
User Input	The user inputs the UART to read from. 1=UART port 1 : not used 2=UART port 2 : Bit Engine 3=UART port 3 : Analogue board <UartNr >
Example	DS:> 1212 2 121200: The value that was read is: 0x50 0xD1 0x00 Test OK @

Nucleus Name	**DS_SYS_VideoLoopThroughStart**
Nucleus Number	1213
Description	The video signal, which is confirm the user input, is routed from the input to the output. Input is set with the routing nucleus 1112. All outputs are enabled.
User Input	<vipInput> <VideoOutput> <VideoStandard> 1. vipInput (CVBS, YC, YUV, RGB). 2. VideoOutput (YUV, RGB). 3. VideoStandard (PAL, NTSC).
Example	DS:> 1213 CVBS RGB PAL 121300: Test OK @

Nucleus Name	**DS_SYS_VideoLoopThroughStop**
Nucleus Number	1214
Description	Stop routing the video input to all the outputs.
User Input	-
Example	DS:> 1214 121400: Test OK @

Nucleus Name	**DS_SYS_VideoLoop**
Nucleus Number	1215
Description	Note: Before executing this nucleus the user must route the video signal on the analog board with nucleus DS_ANAB_VideoRouting(1112).
User Input	Video input of the digital board: - CVBS - YC - YUV - RGB - TEST (The video output will be routed to the video input on the digital board.) Video standard: - PAL - NTSC When no input is given, the nucleus will take TEST for video input and PAL for video standard.

Example	DS:> 1215 cvbs ntsc 121500: Test OK @ DS:> 1215 cvbs pal 121508: The VideoInputProcessor cannot detect a sync-signal. Error @ DS:> 1215 yuv ntsc 121511: Error in luminance signal(Y) Error in chrominance signal(U) Error in chrominance signal(V) Error @

Nucleus Name	**DS_SYS_AudioLoop**
Nucleus Number	1216
Description	The user first needs to select how the audio path must be routed on the analogue board (FRS_DS_ANAB_AUDIO_VIDEO_ROUTING) and/or digital board before calling this nucleus. The user also has to route the audio outputs back to the inputs by means of cables. In this nucleus the Chrysalis generates an audio sine signal with a specific signature and sends it to the output of the digital board (FRS_DS_CHR_SINE). The Chrysalis encodes the audio signal to MPEG I layer II and after this the signature of the signal will be checked.
User Input	None
Example	DS:> 1216 121600: Test OK @

Nucleus Name	**DS_SYS_SlashVersionSet**
Nucleus Number	1217
Description	Set the slash version of the system
User Input	The slash version
Example	DS:> 1217 82121700: Test OK @

Nucleus Name	**DS_SYS_SlashVersionGet**
Nucleus Number	1218
Description	Get the slash version of the system
User Input	None
Example	DS:> 1218 121800: The slash version is: 82 Test OK @

Nucleus Name	**DS_SYS_Virginize**
Nucleus Number	1219
Description	(Re-) Virginize the recorder. User data in the NVRAM of the analogue board is cleared
Example	DS:> 1219 121900: Test OK @

Nucleus Name	**DS_SYS_VirginModeOn**
Nucleus Number	1220
Description	Turn on the virgin mode functionality (e.g. the auto channel search upon start-up)
User Input	None
Example	DS:> 1220 122000: Test OK @

Nucleus Name	**DS_SYS_VirginModeOff**
Nucleus Number	1221
Description	Turn off the virgin mode functionality (e.g. the auto channel search upon start-up)
User Input	None
Example	DS:> 1221 122100: Test OK @

Nucleus Name	**DS_SYS_DisplayFatalOn**
Nucleus Number	1223
Description	Turn on the display-fatal functionality which displays debug-information on the display when encountering a fatal error condition from which could not be recovered automatically
User Input	None
Example	DS:> 1223 122300: Test OK @

Nucleus Name	**DS_SYS_DisplayFatalOff**
Nucleus Number	1224
Description	Turn off the display-fatal functionality which displays debug-information on the display when encountering a fatal error condition from which could not be recovered automatically
User Input	None
Example	DS:> 1224122400:Test OK @

Nucleus Name	**DS_SYS_DisplayFatalGet**
Nucleus Number	1225
Description	Get the display-fatal flag of the recorder
User Input	None
Example	DS:> 1225 122500: Test OK @

Nucleus Name	**DS_SYS_SettingsSet**
Nucleus Number	1226
Description	Programs the digital board settings into the boot EEPROM on the digital board.
User Input	A large hexadecimal value that represents the digital board settings obtained from the DbString.exe program or from a reference set.
Example	DS:> 1226 6469616774737462010102000101010101000020080000 122600: Test OK @

Nucleus Name	**DS_SYS_SettingsDisplay**
Nucleus Number	1228
Description	Show the settings that are programmed in the BROM on the digital board.
User Input	None.
Example	DS:> 1228 Settings ID: 6D7920626F61726400020300010101020101000020080000 Board name: my board Hardware ID: 0 Codec IC: PNX7100_MF2 Video Input Processor IC: SAA7118 Progressive Scan Deinterlacer IC: None Progressive Scan Denc IC: ADV7196 I-Link physical layer circuit IC: PDI1394P25 I-Link link layer circuit IC: PDI1394P40 Audio clock: Clock scheme 1 Bit engine connector: available IDE connector 1: available IDE connector 2: not available PCI connector: not available RAM size 32MByte ROM size (NOR FLASH bank 1) 8MByte ROM size (NOR FLASH bank 2) Not available ROM size (NAND FLASH) Not available Bit Engine: AV 2.0 122800: Test OK @

Nucleus Name	**DS_SYS_SettingsGet**
Nucleus Number	1229
Description	Get the digital board diversity settings string that is programmed in the BROM on the digital board.
User Input	None.

Example

```
DS:> 1229
122900: 6D79206266F61726400020300010101020101000020080000
Test OK @
```

Nucleus Name	**DS_SYS_AudioLoopThroughStart**
Nucleus Number	1230
Description	Description: The audio input is routed from the an input to all outputs. Input is set with the routing nucleus 1113. All outputs are enabled.
User Input	None.

Example

```
DS:> 1230
123000:
Test OK @
```

Nucleus Name	**DS_SYS_AudioLoopThroughStop**
Nucleus Number	1231
Description	Stop routing the audio input to all the outputs
User Input	-

Example

```
DS:> 1231
123100:
Test OK @
```

Nucleus Name	**DS_SYS_SettingsHwIdSet**
Nucleus Number	1232
Description	Double check whether stored HW-string equals actual HW as far as we can automatically detect this. An automatic and a manual mode is supported.
User Input	- 'manual' or 'MANUAL' to enter manual mode - default is automatic mode where the nucleus stops upon and reports the first encountered error

Example

```
DS:> 1233
123300:
Test OK @

DS:> 1233 manual
123300:
Test OK @

DS:> 1233
123301:Hardware ID mismatch: in HW-Diversity string:99, actual in FLASH:0

Error @

DS:> 1233 manual
Hardware ID mismatch! in HW-Diversity string:99, actual in FLASH:0

Enter the correct HW ID of the digital board.
> 0
The HW-diversity string has been modified by you. Settings:
Board name:                    DIAG
Hardware ID:                   0
Codec IC:                      PNX7100_MF3
Video Input Processor IC:          SAA7118
Progressive Scan Deinterlacer IC:  None
Progressive Scan Denc IC:          ADV7196
I-Link physical layer circuit IC:  PDI1394P25
I-Link link layer circuit IC:      PDI1394P40
Audio clock:                   Clock scheme 1
Bit engine connector:             available
IDE connector 1:                  available
IDE connector 2:                  not available
PCI connector:                    not available
RAM size                       32MByte
ROM size (NOR FLASH bank 1)        8MByte
ROM size (NOR FLASH bank 2)        Not available
ROM size (NAND FLASH)            Not available
Is it OK to program this inthe new HW-diversity string? ([y]es/[n]o):y
Diversity HW-string programmed successfully.
123300:
Test OK @

DS:>
```

Nucleus Name	**DS_SYS_SettingsDoubleCheck**
Nucleus Number	1233
Description	This nucleus sets the HW-Id in the HW-diversity string
User Input	- <HW-ID> - The hardware ID to set -No input - The user will be asked for the ID
Example	DS:> 1232 Enter the new HW ID of the digital board (Currently equals 21) Enter a value between 0 and 99: > 22 The HW ID will be set to: 22. Is that correct? ([Y/N]):y 123200: Test OK @ DS:> 1232 Enter the new HW ID of the digital board (Currently equals 22) Enter a value between 0 and 99: > The HW ID will be set to: 0. Is that correct? ([Y/N]):N 123202: Setting the HW ID was aborted by the user. Error @ DS:> 1232 99 123200: Test OK @

Electronic Program Guide Board (EPGB)

Nucleus Name	**DS_EPGB_VersionGet**
Nucleus Number	1300
Description	Returns the version of the EPG board.
User Input	None
Example	DS:> 1300 130000: Version : 6.1.9 Test OK @

PCMCIA INTERFACE (PCMCIA)

Nucleus Name	**DS_PCMCIA_Reset**
Nucleus Number	1400
Description	Reset the PCMCIA device by sending a reset command through IDE
Example	DS:> 1400 140000: Test OK @

Nucleus Name	**DS_PCMCIA_Inquiry**
Nucleus Number	1401
Description	Get the vendor- and product identification and the product revision level of the media in the slot.
Example	DS:> 1401 140100: Test OK @

Nucleus Name	**DS_PCMCIA_WriteRead**
Nucleus Number	1402
Description	Perform a Write Read test to a random sector on the inserted medium in the PCMCIA device and check if the data read is equal to the data written.
Example	DS:> 1402 140200: Test OK @

Nucleus Name	**DS_PCMCIA_Diagnostics**
Nucleus Number	1403
Description	Shall perform the internal diagnostic tests implemented by the PCMCIA slot. The electronics of the PCMCIA slot are tested here, not the inserted medium.
Example	DS:> 1403 140300: Test OK @

HARD DISK DRIVE (HDD)

Nucleus Name	**DS_HDD_Communication**
Nucleus Number	2100
Description	Check the communication between the digital board and the hard disk drive by querying the device type of the hard disk drive
User Input	None
Example	DS:> 2100 210000:Found a hard disk drive: MASTER device on IDE interface 1 Test OK @

Nucleus Name	**DS_HDD_Reset**
Nucleus Number	2101
Description	Reset the hard disk drive
User Input	None
Example	DS:> 2101 210100: Resetting IDE interface 1 succeeded Test OK @

Nucleus Name	**DS_HDD_VersionGet**
Nucleus Number	2102
Description	Get the vendor- and product identification and the product revision level of the hard disk drive
User Input	None
Example	DS:> 2102 210200: Serial number = F19LP8WE,Firmware rev. = VAM51JJ0 ,Model number = Maxtor 2F040L0 Test OK @

Nucleus Name	**DS_HDD_WriteRead**
Nucleus Number	2103
Description	Write data to the hard disk, read it back and verify the data read back. **ATTENTION:** THIS NUCLEUS DESTROYS DATA ON THE DISK! A COMPLETE FORMAT OF THE HDD MIGHT BE NECESSARY!
User Input	None
Example	DS:> 2103 210300: OK, writing to sector 3f95776 Test OK @

Nucleus Name	**DS_HDD_CapabilitiesGet**
Nucleus Number	2104
Description	Get the cylinders, heads and track information of the hard disk drive
User Input	None
Example	DS:> 2104 Number of cylinders 16383 Number of heads 16 Number of sectors per track 63 Capacity in sectors 80293248 Number of current cylinders 16383 Number of current heads 16 Number of current sectors per track 63 Current capacity in sectors 16514064 Number of unformatted bytes per track 0 Number of unformatted bytes per sector 0 210400: Test OK @

Nucleus Name	**DS_HDD_Diagnostics**
Nucleus Number	2105
Description	Shall perform the internal diagnostic tests implemented by the hard disk drive.
User Input	None
Example	DS:> 2105 210500: Test OK @

Nucleus Name	**DS_HDD_UploadImage**
Nucleus Number	2106

Description	Upload raw data from the HDD to a DVD+RW
User Input	The user can enter 3 parameters in the next format: <COMMAND> <HDD sector> <nr of HDD sectors> <COMMAND> is one of the next strings: · NEW: Create a new transfer image table, <HDD sector> and <nr of HDD sectors> must be entered. The tray of the DVD drive is sent out an the user is asked to insert a DVD+RW · ADD: Add a section to the current transfer table, <HDD sector> and <nr of HDD sectors> must be entered · READ: Read the current transfer image table from the DVD. The tray of the DVD drive is sent out an the user is asked to insert a DVD+RW · VIEW: View the contents of the current transfer table · GO: Copy data from the HDD to the DVD+RW according to the currently entered transfer table <HDD sector> = the sector on HDD to start reading from <HDD sectors> = the number of HDD sectors to transfer
Example	

```
DS:> 2106
210605: Invalid user input
Error @
DS:> 2106 READ
Please insert a writable DVD+RW
210609: Unable to update transfer table
Error @
DS:> 2106 NEW 0x1 2048
Creating new transfer table
Adding entry 1 to transfer table
Length 1 entries
210605:  NEW 0X1 2048
Test OK @
DS:> 2106 VIEW
Length 1 entries
Entry 1:  hdd
Position  : 0x1
nrHddSectors : 0x800
dvdPosition  : 0x34040
nrDvdSectors : 0x200
210605:  VIEW
Test OK @
DS:> 2106 ADD 0x2001 20480
Adding entry 2 to transfer table
Length 2 entries
210605:  ADD 0X2001 20480
Test OK @
DS:> 2106 GO
Please insert a writable DVD+RW
Executing transfer table 1 of 1, size 1048576 bytes (=1 MB)
Calibrating laser of DVD drive
Start creating image on DVD at 0x34040. Checking ... <OK>
210600: Transfer OK
Test OK @
```

Nucleus Name	**DS_HDD_DownloadImage**
Nucleus Number	2107
Description	Download a raw image from a DVD+RW disc to the hard disc drive. This image will be written on the hard disc drive.
User Input	Actions: The tray of the DVD drive is sent out an the user is asked to insert a DVD+RW

Example

```
DS:> 2107
Please insert the Master DVD <OK>
Executing transfer table 1 of 4
524288 bytes
Dvd Sector     0x50000
Dvd Sector Count 256
Hdd Sector     0x40000
Hdd Sector Count 1024
please wait ..<OK>
Executing transfer table 2 of 4
10485760 bytes (=10 MB)
Dvd Sector     0x70000
Dvd Sector Count 5120
Hdd Sector     0x60000
Hdd Sector Count 20480
please wait ..<OK>
Executing transfer table 3 of 4
524288 bytes
Dvd Sector     0x50000
Dvd Sector Count 256
Hdd Sector     0x40000
Hdd Sector Count 1024
please wait ..<OK>
Executing transfer table 4 of 4
524288 bytes
Dvd Sector     0x50000
Dvd Sector Count 256
Hdd Sector     0x40000
Hdd Sector Count 1024
please wait ..<OK>
210700: Transfer OK
Test OK @
```

Nucleus Name	**DS_HDD_RandomReadScan**
Nucleus Number	2108
Description	Perform a short random read scan of x times 1000 commands.
User Input	Number of commands to send (in multiples of 1000), if no input is given 1000 commands will be sent
Technical	-Initialise the HDD connection -Get the user input -Generate a random sequence of test sectors -For every sector in the random sequence do -Read the sector and measure the time to perform this action -Update a list of statistics about the measurement -Display statistical information about the test sequence -If more than 10% above 50 ms and/or more than 1 request in between 100 & 200ms and/or requests above 200 ms make the result of the test fail.
Execution Time	Depending on the user input x times 30 seconds
User Input	parameters in the next format: <nr_cmds><GRAPH> - Number of commands to send (in multiples of 1000), if no input is given 1000 commands will be sent - "GRAPH" optional to print out the measured read scan graph

Example

```
DS:> 2108
210800:
 Minimum access time = 9 msec (sector 4822201)
Maximum access time = 41 msec (sector 23668107)
Average access time = 28 msec
999 commands below 50 msec
1 command between 50 and 100 msec
0 commands between 100 and 200 msec
0 commands above 200 mesc
Test OK @

DS:> 2108
210802: Performance failure
Minimum access time = 9 msec (sector 4822201)
Maximum access time = 101 msec (sector 23668107)
Average access time = 35 msec
980 commands below 50 msec
19 command between 50 and 100 msec
1 commands between 100 and 200 msec
0 commands above 200 mesc
Error @
```

Nucleus Name	**DS_HDD_LinearSurfaceScan**
Nucleus Number	2109
Description	Perform a linear surface scan so that most of the disc is covered.
Technical	- Initialise the HDD connection - Get the user input - Generate a sequence of test sectors according to the user input - For every sector in the sequence do - Read the sector and measure the time to perform this action - Update a list of statistics about the measurement - Display statistical information about the test sequence - If more than 1% above 100 ms and/or more than 0.1% above 200 msec and/or requests above 300 msec make the result of the test fail.
Execution Time	Depending on the user input x times 30 seconds
User Input	parameters in the next format: <SECTORS> <STEP> <LOW> <HIGH> <GRAPH> - SECTORS: Specifies the number of sectors to read in each access - STEP: Specifies the step (in sectors) between each access. - LOW: The start sector address of an explicit range of LBA addresses to be used for testing. If no value is entered LBA 0 will be used - HIGH: The end sector address of an explicit range of LBA addresses to be used for testing. If no value is entered the maximum LBA will be used. - "GRAPH" optional to print out the measured read scan graph

Example

```
DS:> 2109
210900:
Minimum access time = 9 msec (sector 4822201)
Maximum access time = 41 msec (sector 23668107)
Average access time = 28 msec
999 commands below 50 msec
1 command between 100 and 200 msec
0 commands between 200 and 300 msec
0 commands above 300 msec
Test OK @

DS:> 2109
210903: Performance failure
Minimum access time = 9 msec (sector 4822200)
Maximum access time = 101 msec (sector 23662200)
Average access time = 35 msec
980 commands below 50 msec
19 command between 100 and 200 msec
1 commands between 200 and 300 msec
0 commands above 300 mesc
Error @
```

Nucleus Name	**DS_HDD_SpinOff**
Nucleus Number	2110
Description	Put the HDD in parking position by sending the sleep command so it can be moved without endangering the mechanical parts
User Input	None

Error	Number	Description
	210500	The spin off of the hard disk drive device succeeded
	210501	The initialisation of IDE failed
	210501	The initialisation of IDE failed
	210501	The sleep ATA command failed
Example	DS:> 2105 210500: Test OK @	

Script

Nucleus Name	**DS_IH_ScriptHandler**
Nucleus Number	Script
Description	
Included tests:	1. DS_ANAB_COMMUNICATIONECHO_NUC 2. DS_DCB_COMMUNICATIONECHO_NUC 3. DS_BROM_COMMUNICATION_NUC 4. DS_SYS_SETTINGSDISPLAY_NUC 5. DS_CHR_DEVTYPEGET_NUC 6. DS_CHR_INT_PIC_NUC 7. DS_CHR_DMA_NUC 8. DS_BROM_WRITEREAD_NUC 9. DS_NVRAM_COMMUNICATION_NUC 10. DS_NVRAM_WRITEREAD_NUC 11. DS_SDRAM_WRITEREADFAST_NUC 12. DS_FLASH_WRITEREAD_NUC 13. DS_FLASH_CHECKSUMPROGRAM_NUC 14. DS_SYS_HARDWAREVERSIONGET_NUC 15. DS_VIP_DEVTYPEGET_NUC 16. DS_VIP_COMMUNICATION_NUC 17. DS_DVIO_LINKDEVTYPEGET_NUC 18. DS_DVIO_PHYDEVTYPEGET_NUC 19. DS_DVIO_LINKCOMMUNICATION_NUC 20. DS_DVIO_PHYCOMMUNICATION_NUC 21. DS_PSCAN_COMMUNICATIONDENC_NUC 22. DS_PSCAN_COMMUNICATIONDEINTERLACER_NUC 23. DS_BE_COMMUNICATIONECHO_NUC 24. DS_ANAB_COMMUNICATIONIICNVRAM_NUC 25. DS_ANAB_COMMUNICATIONIICTUNER_NUC 26. DS_ANAB_COMMUNICATIONIICSOUNDPROCESSOR_NUC 27. DS_ANAB_COMMUNICATIONIICAVSELECTOR_NUC 28. DS_ANAB_CHECKSUMPROGRAM_NUC
User Input	None

Example

```
DS:> script
Executing User/Dealer script.
Busy executing NUC1100 1-28
Hello Analogue Board
Busy executing NUC1000 2-28
Busy executing NUC200 3-28
Busy executing NUC1228 4-28
Settings ID: 4C4541440D00000000030300010101020101000020080000
Board name: LEAD
Hardware ID: 0
Codec IC: PNX7100_MF3
Video Input Processor IC: SAA7118
Progressive Scan Deinterlacer IC: None
Progressive Scan Denc IC: ADV7196
I-Link physical layer circuit IC: PDI1394P25
I-Link link layer circuit IC: PDI1394P40
Audio clock: Clock scheme 1
Bit engine connector: available
IDE connector 1: available
IDE connector 2: not available
PCI connector: not available
RAM size 32MByte
ROM size (NOR FLASH bank 1) 8MByte
ROM size (NOR FLASH bank 2) Not available
ROM size (NAND FLASH) Not available
Bit Engine: AV 2.0
Busy executing NUC100 5-28
Device ID 7100
Codec ID PNX7100_MF3
F-BCU (0x0102) 1.0 INTC (0x011d) 1.0 PCI-XIO(0x0113) 1.0
SIF (0x013b) 1.0 EJTAG (0x0104) 0.0 S-BCU (0x0102) 1.0
BOOT (0x010a) 1.0 CONFIG (0x013f) 1.0 RESET (0x0123) 1.0
DEBUG (0x0116) 0.0 UART0 (0x0107) 0.1 UART1 (0x0107) 0.1
UART2 (0x0107) 0.1 UART3 (0x0107) 0.1 I2C0 (0x0105) 0.1
I2C1 (0x0105) 0.1 GPIO (0x013c) 1.0 SYNC (0x013a) 1.0
DISP0 (0xa015) 0.2 DISP1 (0xa00f) 0.0 OSD (0x0136) 0.1
SPU (0xa00e) 0.0 MIXER (0x0137) 1.0 DENC (0x0138) 0.1
CCIR (0x0139) 1.0 VDEC (0x0133) 0.1 PARSER (0xa00d) 0.0
DV (0xa00c) 0.0 BEI (0xa00a) 0.0 IDE (0xa009) 0.0
SGDX (0xa008) 0.0 BYTE (0xa00b) 0.0 OUTPUT (0xa003) 0.0
ACOMP (0xa000) 0.0 VFE (0xa001) 0.0 VCOMP (0xa002) 0.0
SCR (0x0000) 0.0 SIFF (0xa011) 0.0 WMD (0xa010) 0.0
AUDIO0 (0xa015) 0.2 AUDIO1 (0xa00f) 0.0 PSCAN (0xa018) 0.0
Busy executing NUC114 6-28
Busy executing NUC115 7-28
Busy executing NUC201 8-28
Busy executing NUC300 9-28
Busy executing NUC301 10-28
Busy executing NUC401 11-28
Busy executing NUC501 12-28
Busy executing NUC503 13-28
BootCode checksum is: 0xBABEB432, which is correct
Diagnostics checksum is: 0xBABED22B, which is correct
Download checksum is: 0xBABE025F, which is correct
Application checksum is: 0xBABE2825, which is correct
Busy executing NUC1200 14-28
Hardware ID = 00
Busy executing NUC600 15-28
Found SAA7118
```

Example	Busy executing NUC601 16-28 Busy executing NUC700 17-28 Device type of the link layer IC: ffc00301 Busy executing NUC701 18-28 Device type of the phy layer IC: 0 Busy executing NUC702 19-28 Busy executing NUC703 20-28 Busy executing NUC801 21-28 Busy executing NUC808 22-28 The IIC acknowledge was not received, which is correct Busy executing NUC900 23-28 Busy executing NUC1101 24-28 Busy executing NUC1102 25-28 Busy executing NUC1104 26-28 Busy executing NUC1105 27-28 Busy executing NUC1111 28-28 BootCode checksum is: 0xBABE6240, which is correct Diagnostics checksum is: 0xBABEDC9A, which is correct Download checksum is: 0xBABEA6B7, which is correct Application checksum is: 0xBABE5968, which is correct PASS DS:>

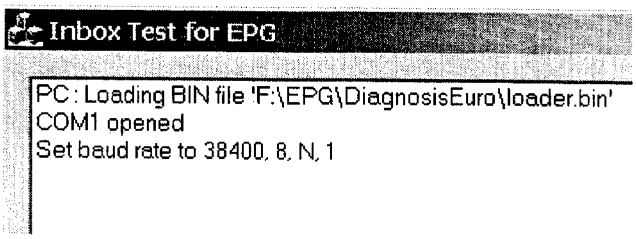
5.5 Diagnosis of EPG Euro Board

The EPG Board can be diagnosed by the help of a PC tool.
Hardware required:

- Service PC
- one free COM port on the Service PC
- ComPair Interface 4822 727 21631 (and serial cable and power supply)
- EPG Interface cable 3122 785 90590

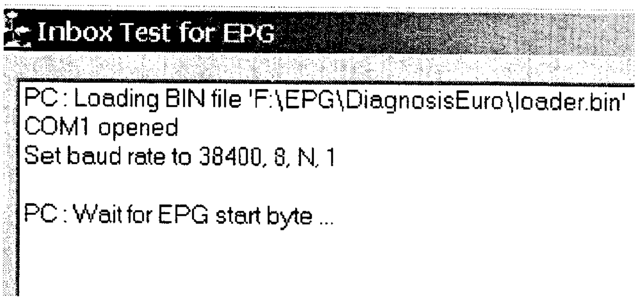
5.5.1 Diagnosis procedure

1. Plug the EPG Interface cable to the connector labelled "VCR" on the ComPair interface. Connect the 3.5mm inline plug of the EPG Interface cable to the G-Link connector (Sat Control connector) at the rear side of the DVDR.
2. Power on the DVDR.
3. Browse to the directory that contains the needed diagnosis software. The directory should contain 2 files:
   - "Inbox.exe"
   - "loader.bin"
4. Execute the program Inbox.exe. The following screen appears:



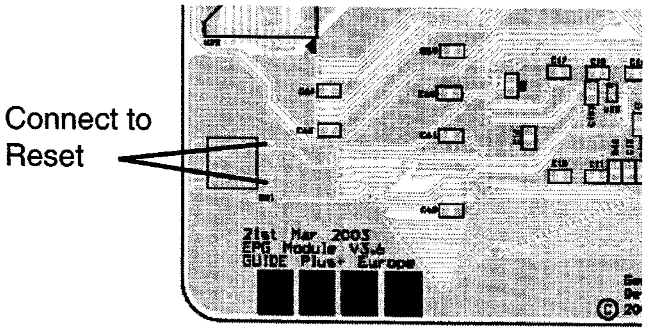
```
PC : Loading BIN file 'F:\EPG\DiagnosisEuro\loader.bin'
COM1 opened
Set baud rate to 38400, 8, N, 1
```

5. Press Button "Set Ready"

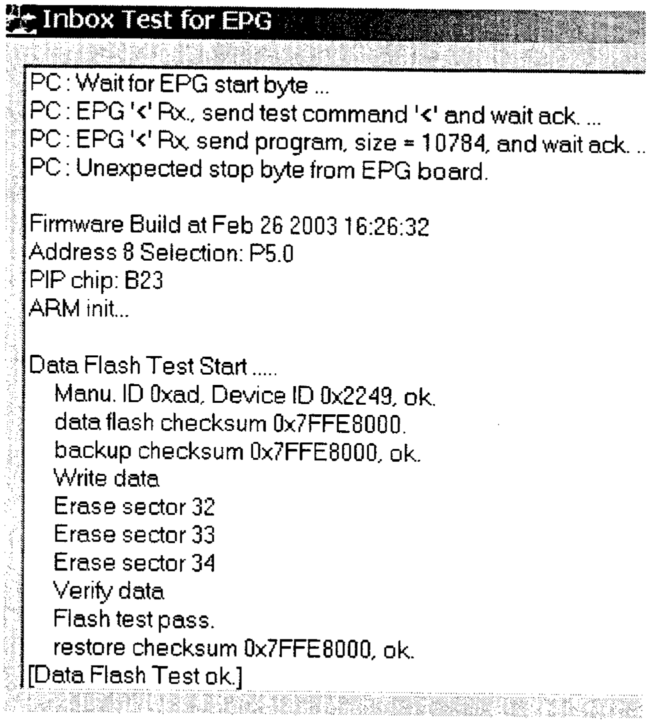


```
PC : Loading BIN file 'F:\EPG\DiagnosisEuro\loader.bin'
COM1 opened
Set baud rate to 38400, 8, N, 1

PC : Wait for EPG start byte ...
```

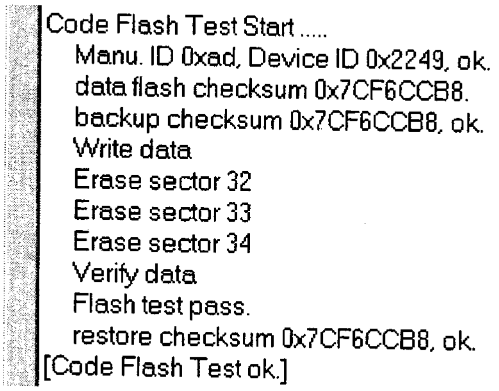
6. Make a reset of the EPG Board by connecting 2 pins on the EPG Board for a short moment by means of a pair of tweezers.



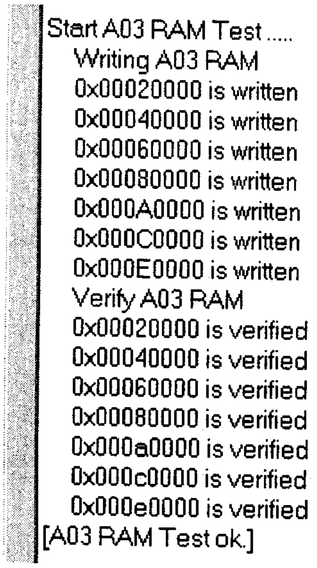
7. The diagnosis procedure should now take place and tests of the main components of the board are performed.



```
PC : Wait for EPG start byte ...
PC : EPG '<' Rx., send test command '<' and wait ack. ...
PC : EPG '<' Rx, send program, size = 10784, and wait ack. ..
PC : Unexpected stop byte from EPG board.

Firmware Build at Feb 26 2003 16:26:32
Address 8 Selection: P5.0
PIP chip: B23
ARM init...

Data Flash Test Start .....
   Manu. ID 0xad, Device ID 0x2249, ok.
   data flash checksum 0x7FFE8000.
   backup checksum 0x7FFE8000, ok.
   Write data
   Erase sector 32
   Erase sector 33
   Erase sector 34
   Verify data
   Flash test pass.
   restore checksum 0x7FFE8000, ok.
[Data Flash Test ok.]
```

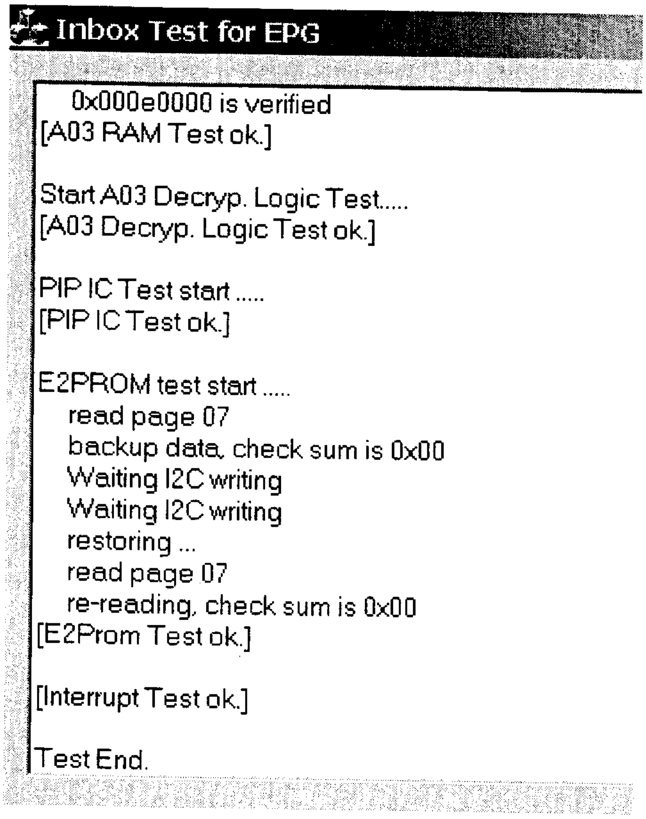


```
Code Flash Test Start .....
    Manu. ID 0xad, Device ID 0x2249, ok.
    data flash checksum 0x7CF6CCB8.
    backup checksum 0x7CF6CCB8, ok.
    Write data
    Erase sector 32
    Erase sector 33
    Erase sector 34
    Verify data
    Flash test pass.
    restore checksum 0x7CF6CCB8, ok.
[Code Flash Test ok.]
```



```
Start A03 RAM Test .....
    Writing A03 RAM
    0x00020000 is written
    0x00040000 is written
    0x00060000 is written
    0x00080000 is written
    0x000A0000 is written
    0x000C0000 is written
    0x000E0000 is written
    Verify A03 RAM
    0x00020000 is verified
    0x00040000 is verified
    0x00060000 is verified
    0x00080000 is verified
    0x000a0000 is verified
    0x000c0000 is verified
    0x000e0000 is verified
[A03 RAM Test ok.]
```

8. Finally "Test End." should be stated:



```
    0x000e0000 is verified
[A03 RAM Test ok.]

Start A03 Decryp. Logic Test.....
[A03 Decryp. Logic Test ok.]

PIP IC Test start .....
[PIP IC Test ok.]

E2PROM test start .....
    read page 07
    backup data, check sum is 0x00
    Waiting I2C writing
    Waiting I2C writing
    restoring ...
    read page 07
    re-reading, check sum is 0x00
[E2Prom Test ok.]

[Interrupt Test ok.]

Test End.
```

5.6 Format of Hard Disk

After replacement of the hard disk by a new one, the HDD has to be formatted with a special Format DVD.
Format DVD for HDRW720 with 80GB HDD... 3122 785 90710,
for DVDR725H with 160GB HDD ... 3122 785 90740.

5.6.1 Format Procedure

- Connect the Digital Board to a PC via serial cable 3122 785 90017
- Start up Hyperterminal or any other terminal program on the PC with the correct settings (19200 8-N-1)
- Power on the set
- Call up nucleus 2107 of the DSW.
- Insert the format DVD to start the format procedure

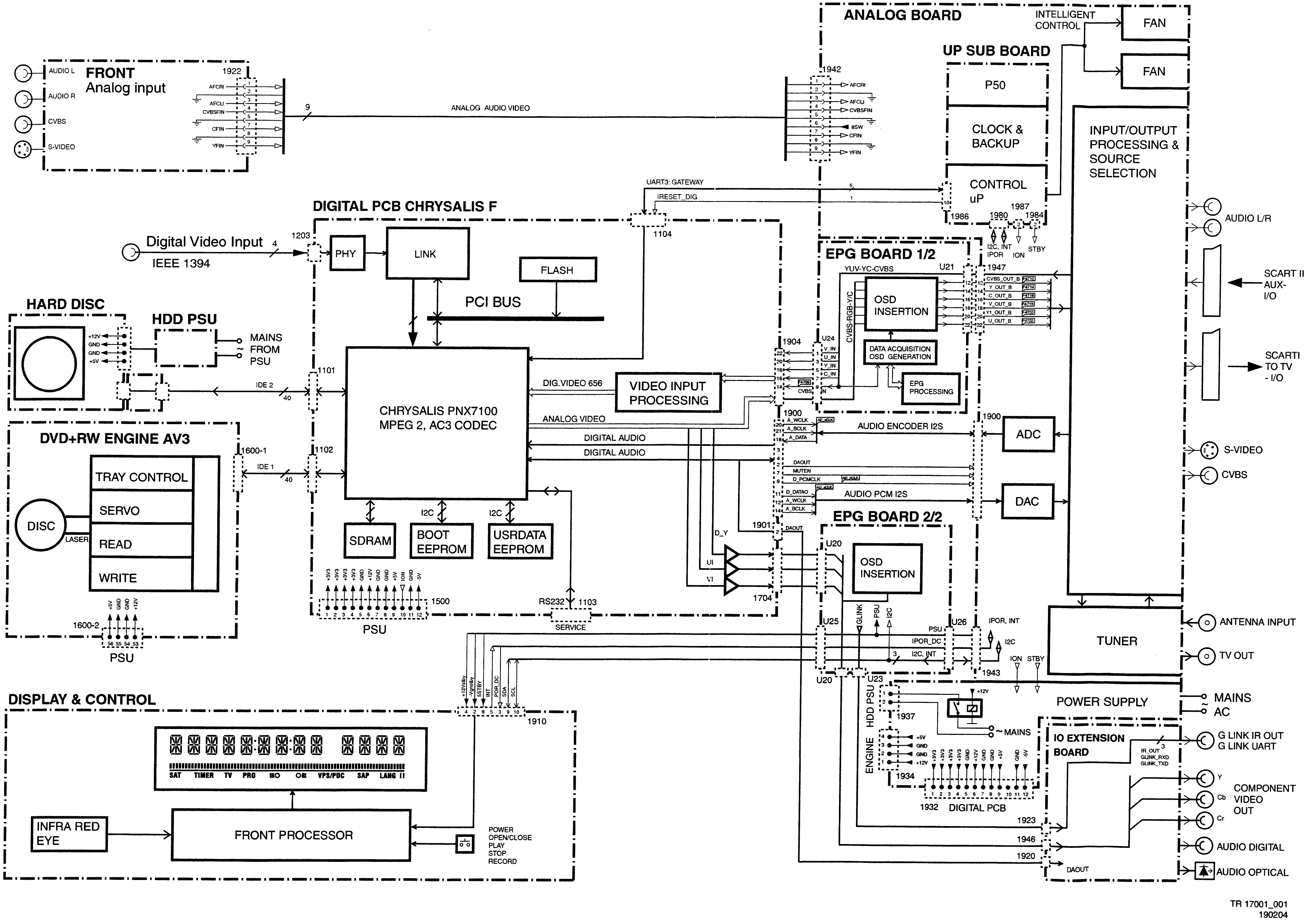
Example:

```
DS:> 2107
Please insert the Master DVD
Executing transfer table 1 of 4
524288 bytes
Dvd Sector 0x50000
Dvd Sector Count 256
Hdd Sector 0x40000
Hdd Sector Count 1024
please wait ..
Executing transfer table 2 of 4
10485760 bytes (=10 MB)
Dvd Sector 0x70000
Dvd Sector Count 5120
Hdd Sector 0x60000
Hdd Sector Count 20480
please wait ..
Executing transfer table 3 of 4
524288 bytes
Dvd Sector 0x50000
Dvd Sector Count 256
Hdd Sector 0x40000
Hdd Sector Count 1024
please wait ..
Executing transfer table 4 of 4
524288 bytes
Dvd Sector 0x50000
Dvd Sector Count 256
Hdd Sector 0x40000
Hdd Sector Count 1024
please wait ..
210700: Transfer OK
Test OK @
```

After this procedure the HDD contains the file system and commercial demo videos

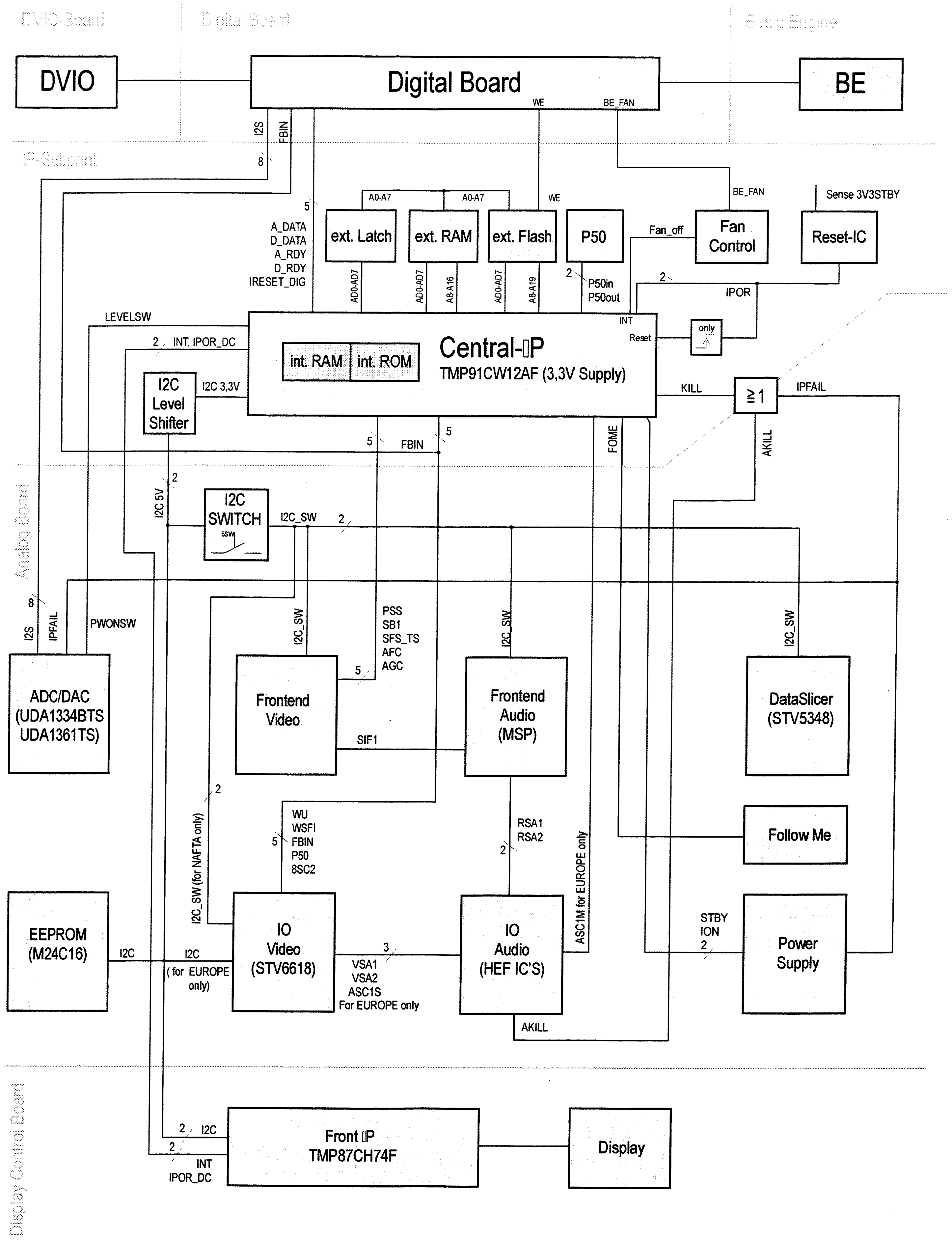
6. Block Diagrams, Waveforms, Wiring Diagram.

Overall Block Diagram


ANALOG BOARD
INTELLIGENT CONTROL
FAN
FAN
UP SUB BOARD
P50
CLOCK & BACKUP
CONTROL uP
INPUT/OUTPUT PROCESSING & SOURCE SELECTION
FRONT
Analog input
AUDIO L
AUDIO R
CVBS
S-VIDEO
1922
AFCRI
AFCLI
CVBSFIN
CFIN
YFIN
9
ANALOG AUDIO VIDEO
1942
AFCRI
AFCLI
CVBSFIN
aSW
CFIN
YFIN
UART3: GATEWAY
IRESET_DIG
1986
1980
1987
1984
I2C, INT
IPOR
ION
STBY
DIGITAL PCB CHRYSALIS F
1104
Digital Video Input
IEEE 1394
4
1203
PHY
LINK
FLASH
PCI BUS
HARD DISC
HDD PSU
MAINS FROM PSU
+12V
GND
GND
+5V
IDE 2
40
1101
CHRYSALIS PNX7100 MPEG 2, AC3 CODEC
DIG.VIDEO 656
VIDEO INPUT PROCESSING
ANALOG VIDEO
DIGITAL AUDIO
DIGITAL AUDIO
DVD+RW ENGINE AV3
TRAY CONTROL
SERVO
READ
WRITE
DISC
LASER
1600-1
IDE 1
40
1102
1600-2
+5V
GND
GND
+12V
56 55 54 53
PSU
SDRAM
I2C
BOOT EEPROM
I2C
USRDATA EEPROM
+3V3
+3V3
+3V3
+3V3
GND
+12V
GND
GND
+5V
ION
GND
-5V
1500
PSU
RS232
1103
SERVICE
EPG BOARD 1/2
YUV-YC-CVBS
U21
1947
CVBS-RGB-Y/C
OSD INSERTION
DATA ACQUISITION OSD GENERATION
EPG PROCESSING
U24
V_IN
U_IN
Y_IN
C_IN
CVBS_IN
CVBS_OUT_B
Y_OUT_B
C_OUT_B
V_OUT_B
Y1_OUT_B
U_OUT_B
1904
1900
A_WCLK
A_BCLK
A_DATA
AUDIO ENCODER I2S
DAOUT
MUTEN
D_PCMCLK
D_DATA0
A_WCLK
A_BCLK
AUDIO PCM I2S
1900
ADC
DAC
EPG BOARD 2/2
1901
DAOUT
D_Y
UI
VI
1704
U20
OSD INSERTION
U25
GLINK
PSU
I2C
U26
PSU
IPOR_DC
I2C, INT
3
U20
U23
IPOR, INT
I2C
ION
STBY
1943
TUNER
AUDIO L/R
SCART II AUX- I/O
SCARTI TO TV - I/O
S-VIDEO
CVBS
ANTENNA INPUT
TV OUT
POWER SUPPLY
MAINS AC
HDD PSU
1937
+12V
~ MAINS
ENGINE
+5V
GND
GND
+12V
1934
+3V3
+3V3
+3V3
+3V3
GND
+12V
GND
GND
+5V
GND
-5V
1932
DIGITAL PCB
IO EXTENSION BOARD
IR_OUT
GLINK_RXD
GLINK_TXD
3
G LINK IR OUT
G LINK UART
Y
Cb
Cr
COMPONENT VIDEO OUT
1923
1946
1920
DAOUT
AUDIO DIGITAL
AUDIO OPTICAL
DISPLAY & CONTROL
+12VdBy
-Vgrid
5STBY
INT
POR_DC
SDA
SCL
1910
SAT TIMER TV PRO ... ... VPS/PDC SAP LANG II
FRONT PROCESSOR
INFRA RED EYE
POWER
OPEN/CLOSE
PLAY
STOP
RECORD

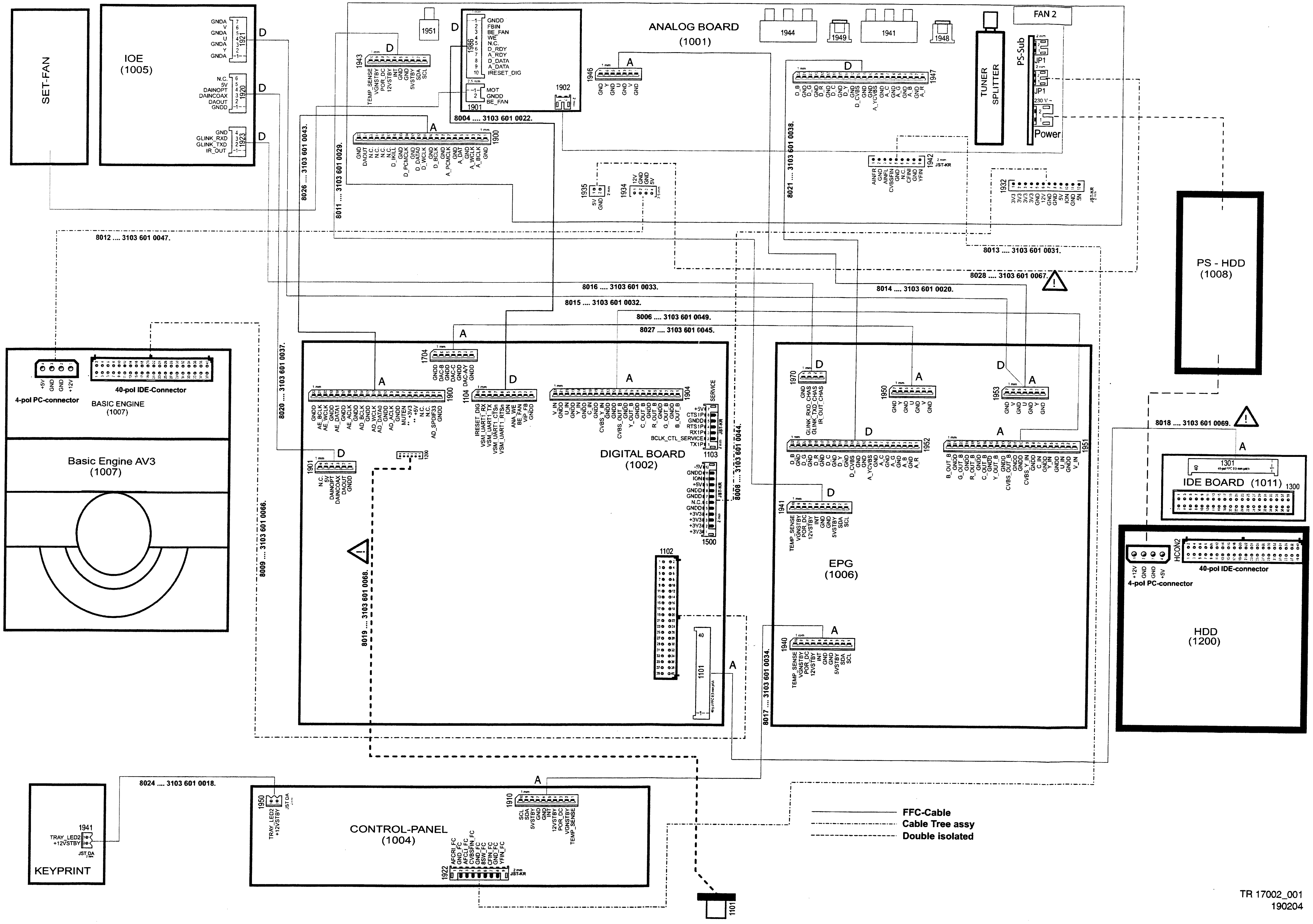
TR 17001_001
190204

Control Block Diagram Analog Board, uP Board


DVIO-Board
Digital Board
Basic Engine
DVIO
Digital Board
BE
WE
BE_FAN
I2S
FBIN
8
uP-Subprint
A0-A7
A0-A7
WE
BE_FAN
Sense 3V3STBY
5
A_DATA
D_DATA
A_RDY
D_RDY
IRESET_DIG
ext. Latch
ext. RAM
ext. Flash
P50
Fan_off
Fan Control
Reset-IC
AD0-AD7
AD0-AD7
A8-A16
AD0-AD7
A8-A19
2
P50in
P50out
2
IPOR
INT
Reset
only
LEVELSW
2
INT. IPOR_DC
int. RAM
int. ROM
Central-µP
TMP91CW12AF (3,3V Supply)
KILL
≥1
IPFAIL
I2C Level Shifter
I2C 3,3V
5
FBIN
5
FOME
AKILL
Analog Board
I2C 5V
2
I2C SWITCH
SSW
I2C_SW
2
8
I2S
IPFAIL
PWONSW
I2C_SW
PSS
SB1
SFS_TS
AFC
AGC
5
I2C_SW
I2C_SW
ADC/DAC (UDA1334BTS UDA1361TS)
Frontend Video
SIF1
Frontend Audio (MSP)
DataSlicer (STV5348)
2
WU
WSFI
FBIN
P50
8SC2
5
RSA1
RSA2
2
Follow Me
I2C_SW (for NAFTA only)
ASC1M for EUROPE only
EEPROM (M24C16)
I2C
I2C
(for EUROPE only)
IO Video (STV6618)
3
VSA1
VSA2
ASC1S
For EUROPE only
IO Audio (HEF IC'S)
AKILL
STBY
ION
2
Power Supply
Display Control Board
2
I2C
2
INT
IPOR_DC
Front µP TMP87CH74F
Display

TR 01019_001
130502

Wiring Diagram

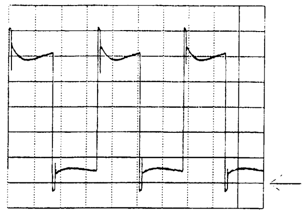

SET-FAN
IOE (1005)
1921
1920
1923
D
GNDA
V
U
N.C.
5V
DAINOPT
DAINCOAX
DAOUT
GNDD
GLINK_RXD
GLINK_TXD
IR_OUT
ANALOG BOARD (1001)
1951
1986
GNDD
FBIN
BE_FAN
WE
N.C.
D_RDY
A_RDY
D_DATA
A_DATA
IRESET_DIG
MOT
1901
1902
8004 .... 3103 601 0022.
1943
1946
1947
1900
1935
1934
1942
1932
1944
1949
1941
1948
FAN 2
TUNER SPLITTER
PS-Sub
JP1
230 V ~
Power
8026 .... 3103 601 0043.
8011 .... 3103 601 0029.
8021 .... 3103 601 0038.
8012 .... 3103 601 0047.
8013 .... 3103 601 0031.
8028 .... 3103 601 0067.
8016 .... 3103 601 0033.
8014 .... 3103 601 0020.
8015 .... 3103 601 0032.
8006 .... 3103 601 0049.
8027 .... 3103 601 0045.
8020 .... 3103 601 0037.
8009 .... 3103 601 0066.
8019 .... 3103 601 0068.
8008 .... 3103 601 0044.
8017 .... 3103 601 0034.
8018 .... 3103 601 0069.
8024 .... 3103 601 0018.
PS - HDD (1008)
4-pol PC-connector
40-pol IDE-Connector
BASIC ENGINE (1007)
Basic Engine AV3 (1007)
1704
1104
1904
1103
1500
1102
1101
1200
SERVICE
DIGITAL BOARD (1002)
1970
1950
1953
1952
1951
1941
1940
EPG (1006)
1301
IDE BOARD (1011)
1300
HCON2
40-pol IDE-connector
4-pol PC-connector
HDD (1200)
KEYPRINT
1941
TRAY_LED2
+12VSTBY
JST DA
CONTROL-PANEL (1004)
1950
1910
1922
SCL
SDA
5VSTBY
GND
INT
12VSTBY
POR_DC
VGNSTBY
TEMP_SENSE
AFCRI_FC
GND_FC
AFCLI_FC
CVBSFIN_FC
GND_FC
BSW_FC
CFIN_FC
YFIN_FC
JST-KR
1101
A
D
FFC-Cable
Cable Tree assy
Double isolated

TR 17002_001
190204

Waveforms

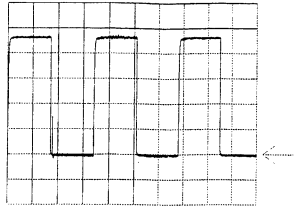
Waveforms Display Board

7106/7108-Emitter



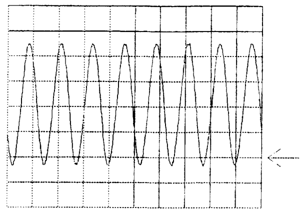
A: DC, 2 V/Div, 10us/Div

IC7103-19



A: DC, 1 V/Div, 10us/Div

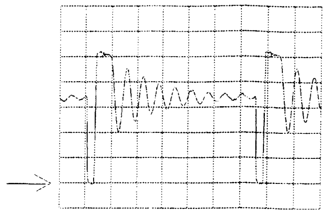
IC7103-8



A: DC, 1 V/Div, 100ns/Div

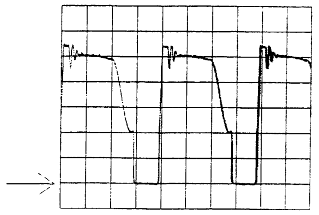
Waveforms Analog Board

F327 VDrain (Standby)



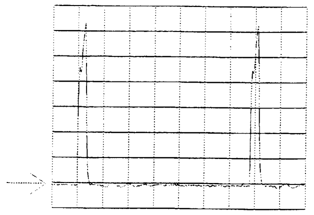
A: DC, 100V/Div
5us/Div

F327 VDrain (no disc loaded)



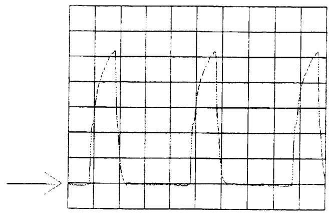
A: DC, 100V/Div
2us/Div

I324 VGate (Standby)



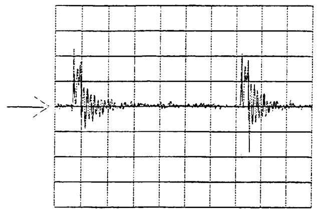
A: DC, 1V/Div
5us/Div

I324 VGate (no disc loaded)



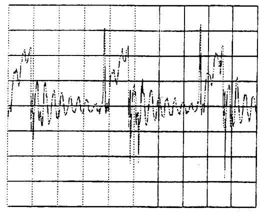
A: DC, 2V/Div
2us/Div

I324 VSource (Standby)



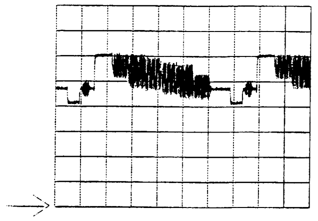
A: DC, 50mV/Div
5us/Div

I324 VSource (no disc loaded)



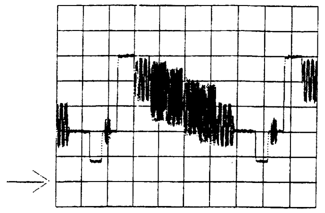
A: DC, 50mV/Div
2us/Div

F723 VFV I723



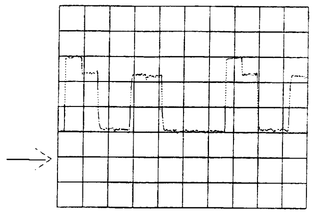
A: DC, 500mV/Div
10us/Div

E465



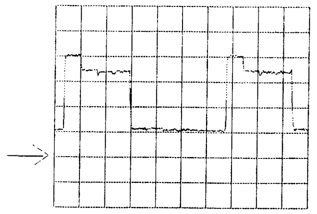
A: DC, 500mV/Div
10us/Div

E461



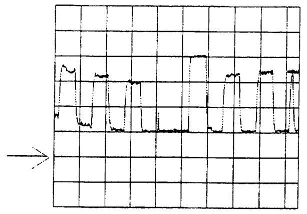
A: DC, 500mV/Div
10us/Div

E462



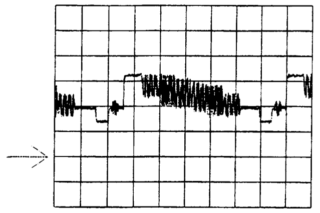
A: DC, 500mV/Div
10us/Div

E463



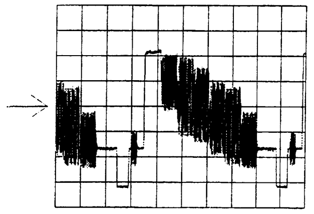
A: DC, 500mV/Div
10us/Div

A_CVBS I405



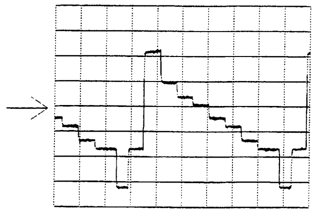
A: DC, 500mV/Div
10us/Div

D_CVBS F4712



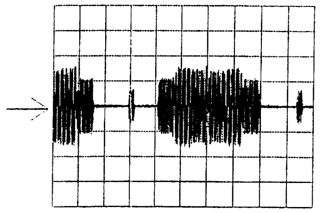
A: DC, 200mV/Div
10us/Div

D_Y F4714



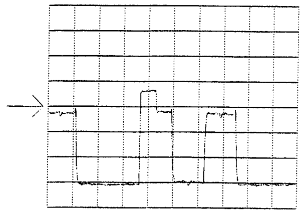
A: DC, 200mV/Div
10us/Div

D_C F4716



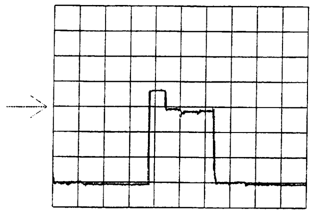
A: DC, 200mV/Div
10us/Div

D_R F4718



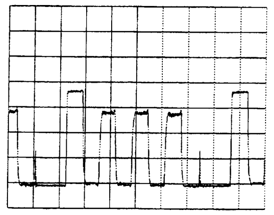
A: DC, 200mV/Div
10us/Div

D_G F4720



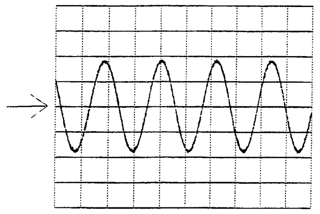
A: DC, 200mV/Div
10us/Div

D_B F4722



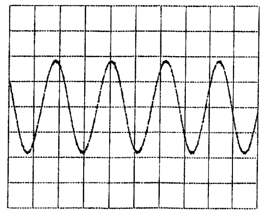
A: DC, 200mV/Div
10us/Div

I502/I504



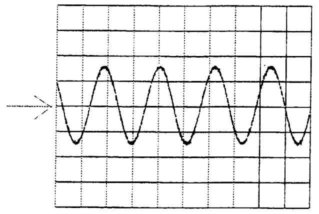
A: DC, 500mV/Div
500us/Div

I517/I518



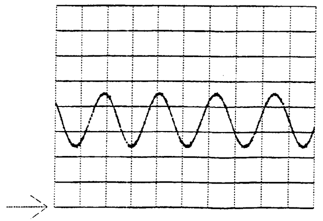
A: DC, 500mV/Div
500us/Div

F501/F502



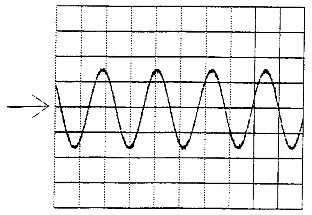
A: DC, 500mV/Div
500us/Div

I014/I032



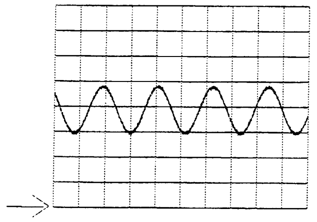
A: DC, 500mV/Div
500us/Div

ARDAC/ALDAC F010/F011



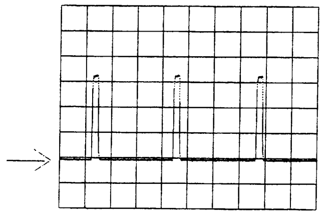
A: DC, 500mV/Div
500us/Div

I623



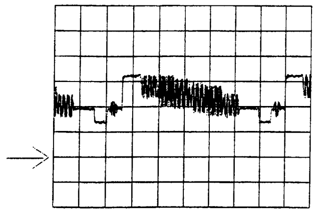
A: DC, 1 V/Div
500us/Div

SYNC F843



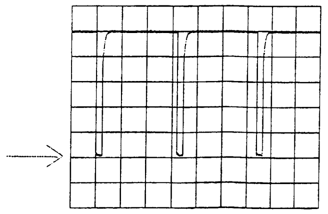
A: DC, 500mV/Div
10us/Div

A_CVBS F8008



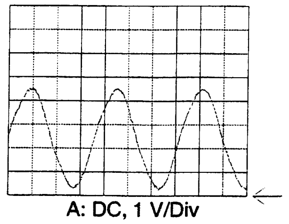
A: DC, 500mV/Div

I818



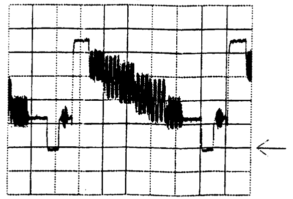
A: DC, 1 V/Div
20us/Div

I994



A: DC, 1 V/Div
20ns/Div

I989

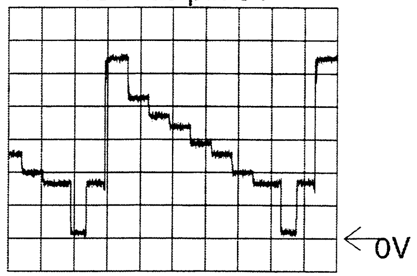


A: DC, 200mV/Div
10us/Div

TR 070018_001
200303

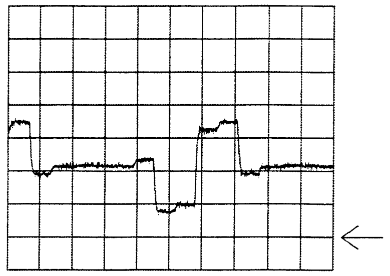
Waveforms Digital Board Chrysalis 2.1

IC7703 pin 34



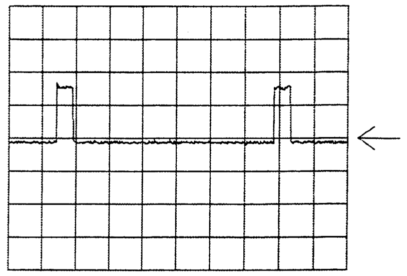
A: DC, 200mV/Div, 5us/Div

IC7703 pin 36



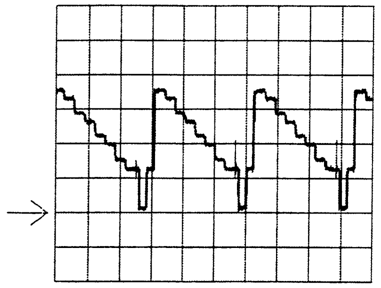
A: DC, 200mV/Div, 5us/Div

HS_IN



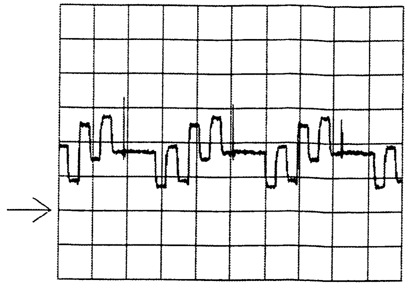
A: DC, 2 V/Div, 10us/Div

Y 1704-2



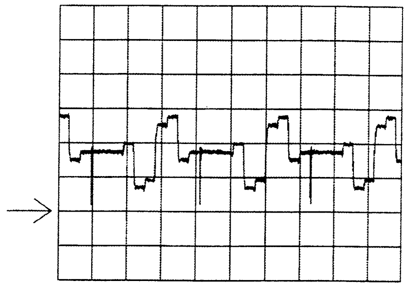
A: DC, 500mV/Div
10us/Div

PB 1704-4



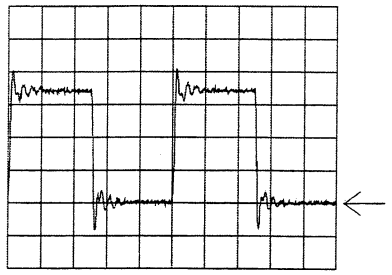
A: DC, 500mV/Div
10us/Div

PR 1704-6



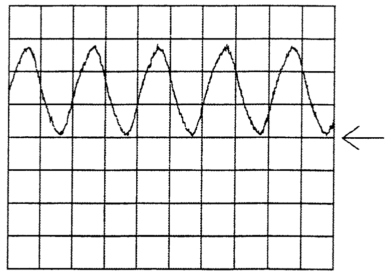
A: DC, 500mV/Div
10us/Div

IC7402 pin 3, F405



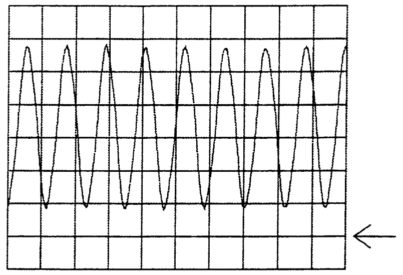
A: DC, 1 V/Div, 50ns/Div

IC7200 pin 60, F203



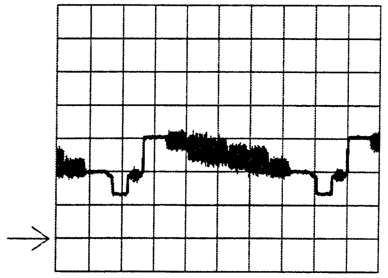
A: DC, 1 V/Div, 20ns/Div

X1001



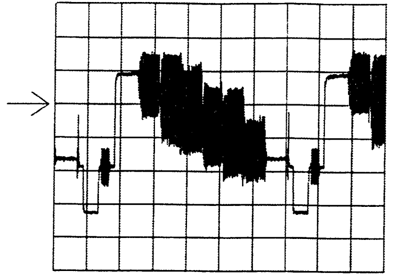
A: DC, 500mV/Div, 2us/Div

A_YCVBS 1904-14



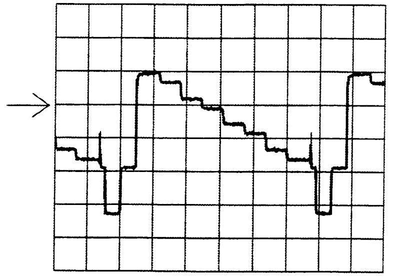
A: DC, 500mV/Div
10us/Div

D_YCVBS 1904-11



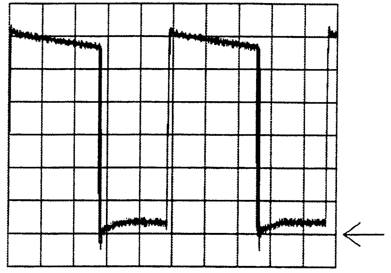
A: DC, 200mV/Div
10us/Div

D_Y 1904-9



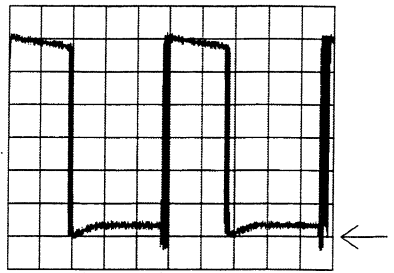
A: DC, 200mV/Div
10us/Div

IC7501 pin 5



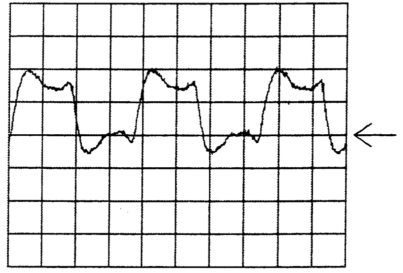
A: DC, 2 V/Div, 1us/Div

IC7501 pin 6



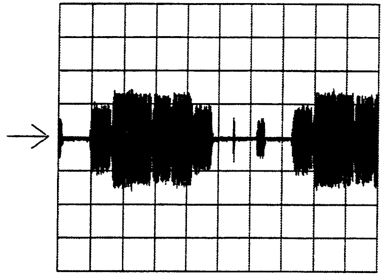
A: DC, 2 V/Div, 1us/Div

IC7703 pin 25



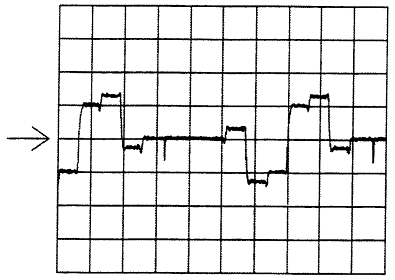
A: DC, 2 V/Div, 10ns/Div

D_C 1904-7



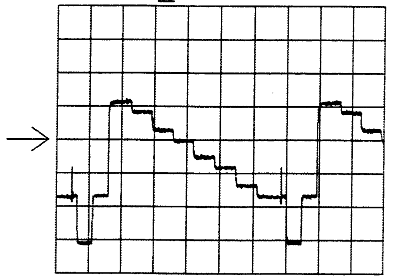
A: DC, 200mV/Div
10us/Div

D_VR 1904-5



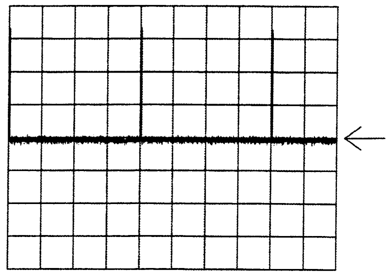
A: DC, 200mV/Div
10us/Div

D_YG 1904-3



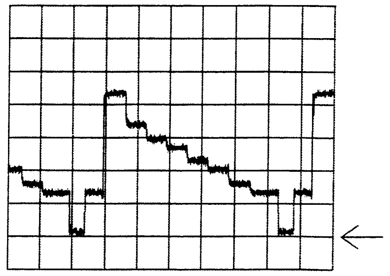
A: DC, 200mV/Div
10us/Div

VS_IN



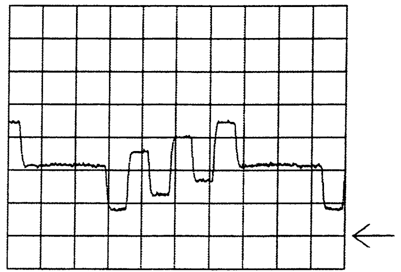
A: DC, 1 V/Div, 5ms/Div

1704-2, F1702



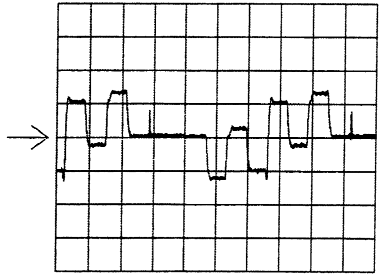
A: DC, 500mV/Div, 5us/Div

IC7703 pin 32



A: DC, 200mV/Div, 5us/Div

D_UB 1904-1

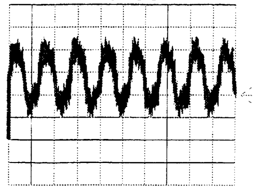


A: DC, 200mV/Div
10us/Div

TR 09014_001
220403

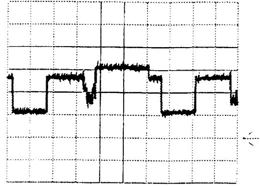
EPG waveforms

TP1 CPUCLK



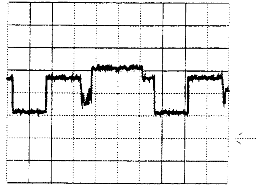
A: DC, 2 V/Div, 5ms/Div

Emitter Q2 R/PSPr_GSA032PIP



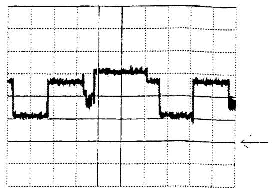
A: DC, 500mV/Div, 10us/Div

Emitter Q3 G/PSY_GSA032PIP



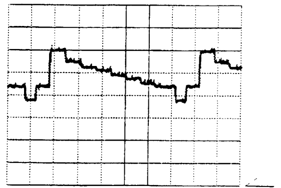
A: DC, 500mV/Div, 10us/Div

Emitter Q4 B/PSPb_GSA032PIP



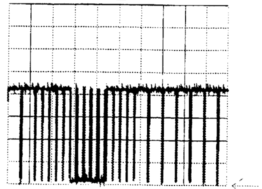
A: DC, 500mV/Div, 10us/Div

IC U50 Pin 1



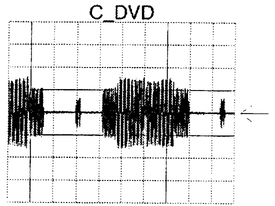
A: DC, 500mV/Div, 10us/Div

TP6 PS_CSYNC



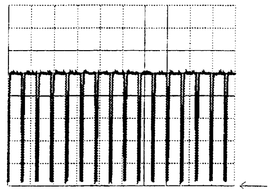
A: DC, 1 V/Div, 100us/Div

C_DVD



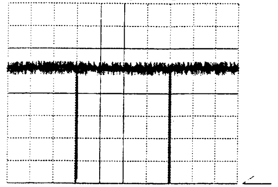
A: DC, 200mV/Div, 10us/Div

TP7 HSYNC



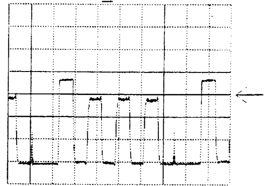
A: DC, 1 V/Div, 100us/Div

TP8 VSYNC



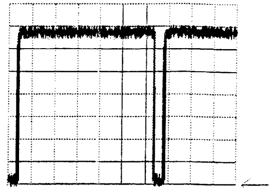
A: DC, 1 V/Div, 5ms/Div

B_OUT



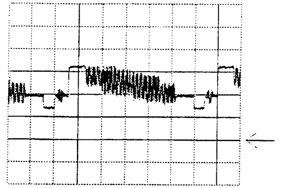
A: DC, 200mV/Div, 10us/Div

TP10 CSI



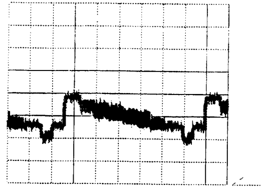
A: DC, 500mV/Div, 10us/Div

CVBS/Y_ANALOG



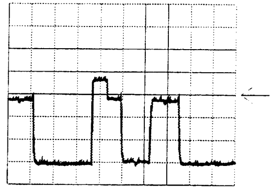
A: DC, 500mV/Div, 10us/Div

TP9 CVBS/Y_ANALOG_BUFFER



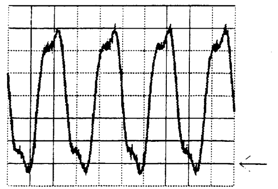
A: DC, 500mV/Div, 10us/Div

VR_DVD



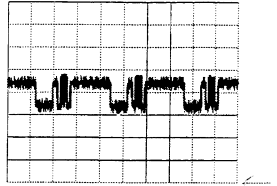
A: DC, 200mV/Div, 10us/Div

IC U11 Pin 1



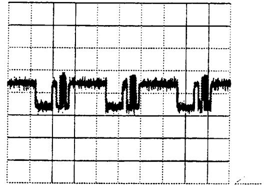
A: DC, 500mV/Div, 20ns/Div

R/Pr_PIP2ENCODER



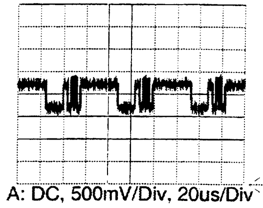
A: DC, 500mV/Div, 20us/Div

G/Y_PIP2ENCODER



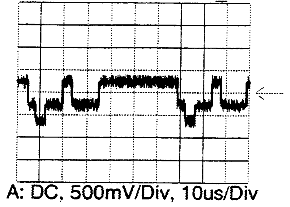
A: DC, 500mV/Div, 20us/Div

B/Pb_PIP2ENCODER



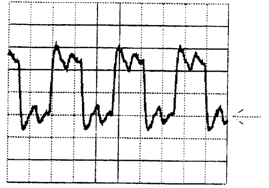
A: DC, 500mV/Div, 20us/Div

IC U13A Pin 1 Y+SYNC_EPG



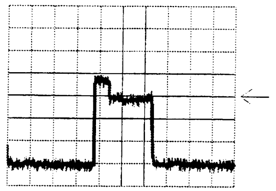
A: DC, 500mV/Div, 10us/Div

IC U14 Pin 3



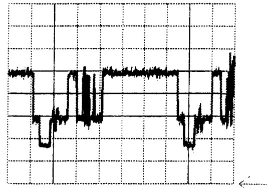
A: DC, 2 V/Div, 20ns/Div

YG_DVD



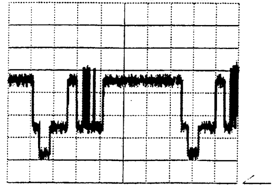
A: DC, 200mV/Div, 10us/Div

IC U14 Pin 10 CVBS_EPG_OUT



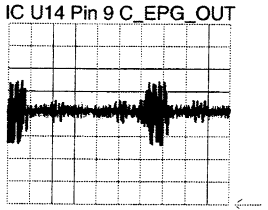
A: DC, 500mV/Div, 10us/Div

IC U14 Pin 11 Y_EPG_OUT



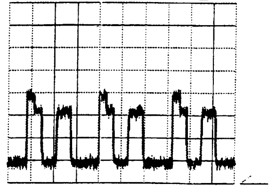
A: DC, 500mV/Div, 10us/Div

IC U14 Pin 9 C_EPG_OUT



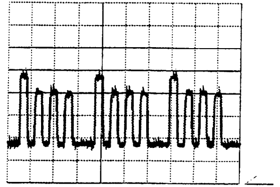
A: DC, 500mV/Div, 10us/Div

IC U13B Pin 7 V_EPG_DVD



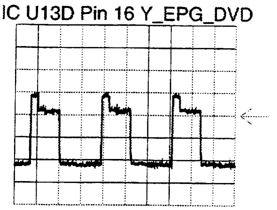
A: DC, 500mV/Div, 20us/Div

IC U13C Pin 10 U_EPG_DVD



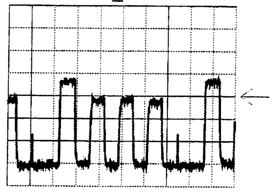
A: DC, 500mV/Div, 20us/Div

IC U13D Pin 16 Y_EPG_DVD



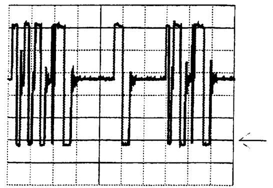
A: DC, 50mV/Div, 20us/Div

UB_DVD



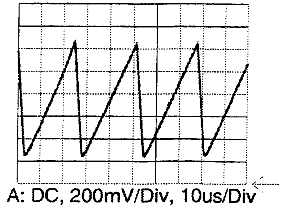
A: DC, 200mV/Div, 10us/Div

IC U28 Pin 2



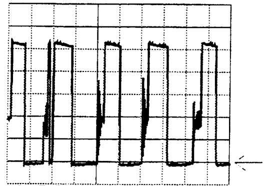
A: DC, 2 V/Div, 50us/Div

IC U28 Pin 3



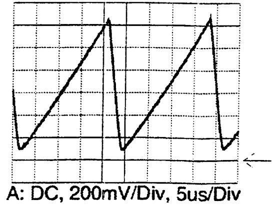
A: DC, 200mV/Div, 10us/Div

IC U40 Pin 2



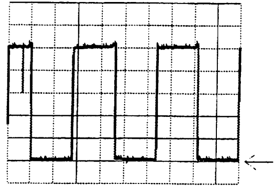
A: DC, 2 V/Div, 20us/Div

IC U40 Pin 3



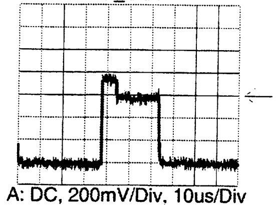
A: DC, 200mV/Div, 5us/Div

IC U41 Pin 2



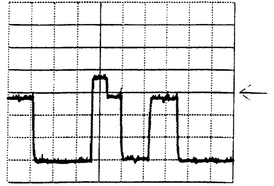
A: DC, 1 V/Div, 5us/Div

G_OUT



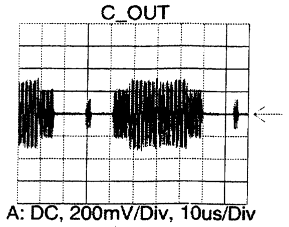
A: DC, 200mV/Div, 10us/Div

R_OUT



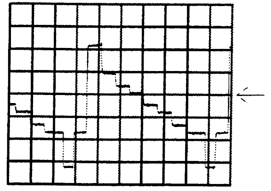
A: DC, 200mV/Div, 10us/Div

C_OUT



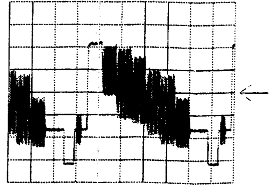
A: DC, 200mV/Div, 10us/Div

Y_OUT



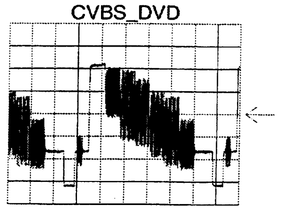
A: DC, 200mV/Div, 10us/Div

CVBS_OUT



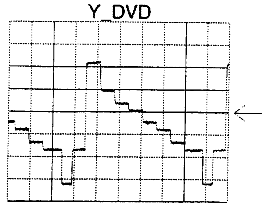
A: DC, 200mV/Div, 10us/Div

CVBS_DVD



A: DC, 200mV/Div, 10us/Div

Y_DVD



A: DC, 200mV/Div, 10us/Div

TR 11003_001
120603

Test points overview Analog Board

F0001	A10
F0002	C10
F0003	C10
F0005	C10
F0007	C10
F0009	C10
F0010	C9
F0011	C10
F0012	C10
F0014	C10
F0016	C10
F0021	A10
F006	C9
F007	C8
F008	C9
F009	C9
F010	A10
F011	B10
F300	A3
F301	A3
F302	A4
F304	B1
F305	B2
F306	A1
F307	B1
F308	A2
F309	A2
F310	A2
F311	A2
F312	B1
F313	A1
F314	A1
F315	C1
F316	C2
F317	C4
F318	C2
F319	C2
F320	C1
F321	C3
F322	C4
F323	B1
F324	B3
F325	A9
F326	B2
F328	B1
F329	B1
F331	A3
F333	A3
F334	A2
F335	A2
F336	A2
F337	A2
F338	B1
F339	B1
F340	A2
F341	B3
F342	C1
F343	A2
F344	C9
F346	A2
F347	C8
F348	C8
F349	C3
F350	C3
F351	A3
F352	C8
F353	C8
F354	A2
F355	C3
F356	C3
F357	C3
F358	C6
F359	C8
F360	C3
F361	C2
F362	A2
F363	A2
F364	A3
F366	B2
F367	B2
F368	B2
F369	B2
F371	A3
F372	A3
F373	B3
F374	B3
F381	C8
F382	C9
F383	C8
F384	C8
F401	A9
F4102	A9
F4103	A9
F412	A8
F4203	C5
F4205	C6
F4207	C6
F4209	C6
F4210	B5
F4505	A9
F4707	A6
F4712	B6
F4714	B6
F4716	B6
F4718	B6
F4720	B6
F4721	A6
F4722	B6
F485	A6
F499	A4
F501	A7
F502	A7
F504	A3
F5101	A5
F5102	A5
F5103	A5
F5106	A5
F5108	A5
F5110	A5
F5113	A4
F5116	A5
F5119	A4
F5120	A4
F5201	A5
F5202	A5
F5203	A5
F5206	A5
F5207	A5
F5208	A5
F5210	A5
F5211	A5
F5213	A4
F5215	A5
F5216	C8
F5219	A4
F5220	A4
F6001	C6
F6002	C10
F6004	C6
F701	A3
F702	B4
F703	A3
F704	A3
F707	A3
F708	B5
F709	B4
F710	B3
F713	C7
F913	B5
F950	C9
I001	C10
I002	B10
I004	C10
I005	B10
I006	B9
I007	B10
I008	B9
I009	B9
I013	B9
I014	B10
I015	B9
I018	B10
I019	B10
I020	A9
I021	B9
I022	C9
I023	B10
I029	C10
I030	B9
I031	C10
I032	B10
I036	A9
I300	A1
I301	A3
I303	B2
I304	B3
I305	B3
I306	A1
I307	C1
I308	B2
I309	B3
I310	C2
I311	B1
I312	B1
I313	B3
I314	A1
I315	B3
I316	A1
I317	A1
I318	C3
I319	C3
I320	C3
I321	B1
I322	B1
I323	A3
I324	B1
I325	B1
I326	A2
I327	B2
I329	A2
I330	C1
I331	C1
I332	B2
I333	A3
I334	A2
I335	C1
I336	B2
I337	A3
I338	A3
I339	A2
I340	C1
I341	A5
I342	A2
I343	C1
I344	C2
I345	A2
I346	A3
I347	B7
I348	C1
I349	B7
I350	C2
I351	C2
I352	B7
I353	A3
I354	A3
I355	C2
I356	A2
I357	A2
I361	A2
I402	A6
I405	A10
I406	A4
I407	A4
I408	A4
I409	A4
I411	B6
I412	B6
I413	C5
I414	A5
I415	C6
I416	B5
I417	B5
I418	C4
I419	C9
I420	C9
I424	A4
I428	A7
I429	A9
I431	A7
I433	A7
I434	A7
I437	A6
I438	B6
I439	A6
I440	A6
I441	A6
I442	B7
I443	A7
I444	A6
I445	A6
I446	B6
I447	B6
I448	A7
I449	A6
I451	A6
I453	A9
I454	A9
I456	B6
I457	B5
I458	A5
I459	A5
I460	A5
I461	A4
I462	A4
I463	A4
I464	A4
I465	A4
I466	B5
I467	A6
I468	B6
I469	B5
I470	B5
I476	A5
I478	B6
I479	B5
I481	B6
I482	B6
I483	B5
I484	A5
I485	A7
I486	A6
I487	A9
I488	A9
I489	A9
I490	A10
I491	A10
I492	A9
I493	A9
I501	A8
I502	B8
I503	A8
I504	B8
I505	C5
I506	B5
I507	A9
I508	A7
I509	A8
I510	A8
I511	A8
I513	B7
I514	C6
I515	B7
I516	B7
I517	B8
I518	B8
I519	A8
I520	A8
I521	A4
I523	A7
I524	A7
I525	B9
I526	B9
I527	B6
I611	B7
I612	B7
I613	C7
I614	B7
I615	B7
I616	B7
I617	B7
I620	B6
I621	B6
I623	B6
I624	B7
I625	B7
I630	C6
I631	C6
I701	A3
I702	B4
I703	B4
I704	B4
I706	B3
I528	B7
I529	A8
I530	A8
I531	A8
I532	A7
I533	A8
I534	A7
I535	A7
I539	A8
I540	A8
I601	B6
I602	C8
I603	B6
I604	B6
I605	B7
I607	B4
I608	C7
I609	B6
I610	B7
I707	B4
I708	B4
I709	B4
I711	C4
I712	B4
I713	C4
I715	A9
I716	A10
I717	B4
I721	C4
I723	C7
I724	C5
I725	C5
I726	B4
I727	B4
I728	B4
I729	B4
I730	B4
I731	C4
I732	A3
I733	A3
I734	A3
I735	A3
I739	B4
I741	B3
I742	B3
I743	B4
I744	B4
I745	B4
I746	B4
I748	B4
I749	C4
I751	C5
I754	C4
I951	C9
I952	B9
I954	B9
I955	B9
I956	B9
I957	B9
I958	B9
I959	B9
I987	A10
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I989	A10
I990	A10
I991	A10
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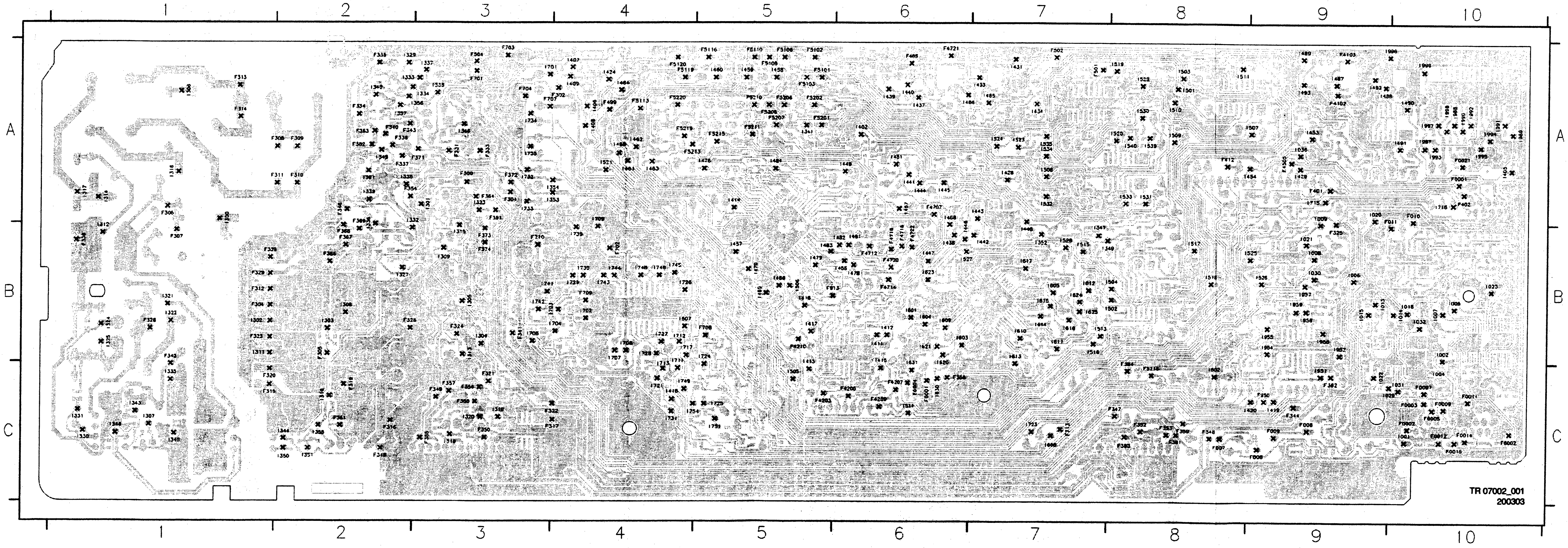
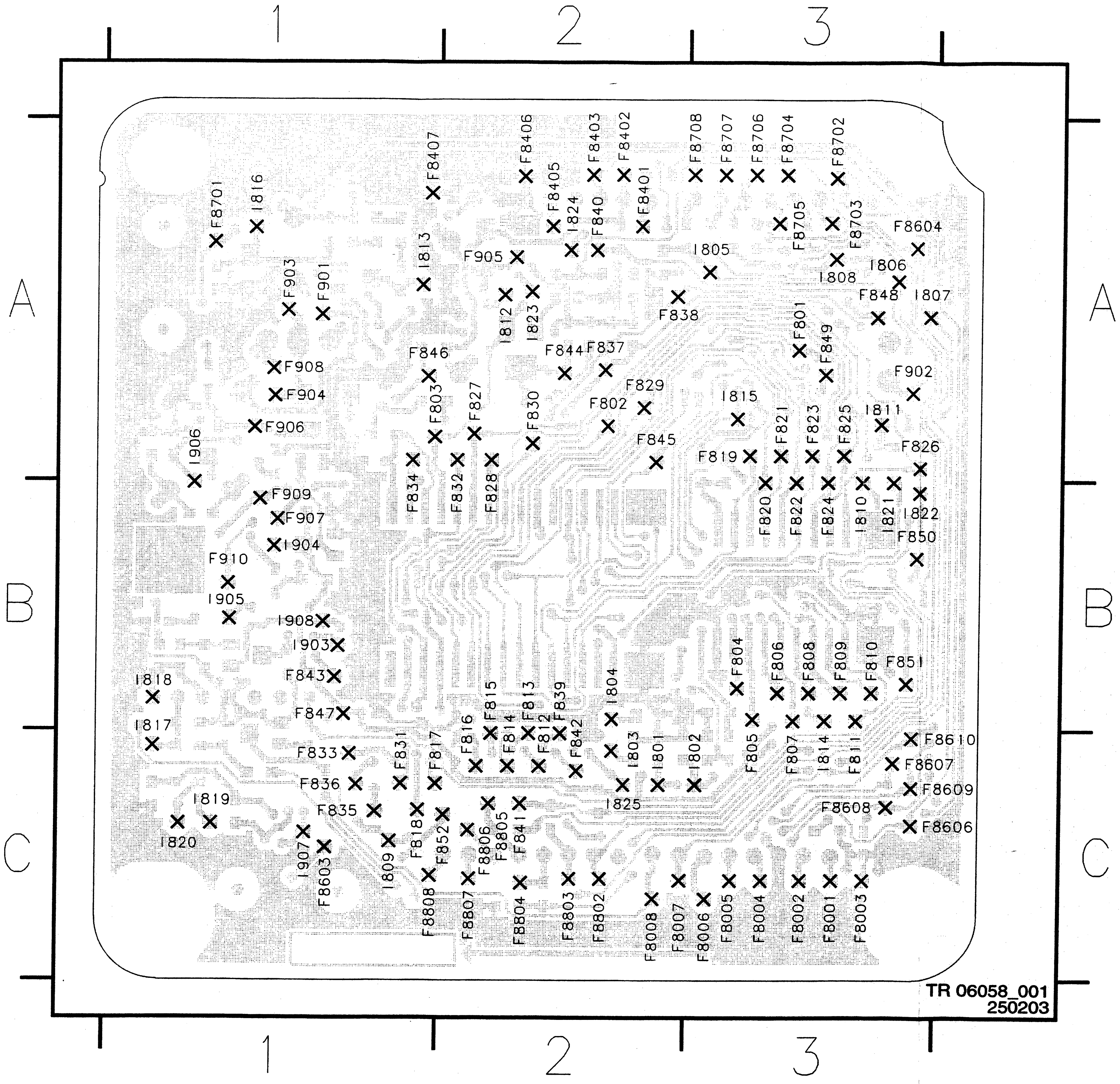
I997	A10
I998	A10
I999	A10



Test points overview UP Sub Board


1
2
3
A
B
C
F8701 I816 F8407 F8406 F8405 I824 F840 F8403 F8402 F8401 F8708 F8707 F8706 F8704 F8702 F8705 F8703 F8604
I813 F905 I805 I808 I806 F903 F901 I812 I823 F838 F848 I807
F846 F844 F837 F801 F849 F908 F902 F904 F803 F827 F830 F829 F802 I815 F821 F823 F825 I811 F906 F845 F819 F826
I906 F834 F832 F828 F820 F822 F824 I810 I821 I822 F909 F907 I904 F850 F910 I905
I908 I903 F804 F806 F808 F809 F810 F851 I818 F843 F815 F813 F839 I804 F816 F814 F812 F842 F847 I817
F8610 F833 F831 F817 I803 I801 I802 F805 F807 I814 F811 F8607 F836 F8609 I819 F835 I825 F8608 F8606
I820 I907 F8603 I809 F818 F852 F8806 F8805 F841 F8808 F8807 F8804 F8803 F8802 F8008 F8007 F8006 F8005 F8004 F8002 F8001 F8003
TR 06058_001
250203

F8001	C3	F831	C1	F8610	C3	I808	A3
F8002	C3	F832	A2	F8701	A1	I809	C1
F8003	C3	F833	C1	F8702	A3	I810	B3
F8004	C3	F834	A1	F8703	A3	I811	A3
F8005	C3	F835	C1	F8704	A3	I812	A2
F8006	C3	F836	C1	F8705	A3	I813	A1
F8007	C2	F837	A2	F8706	A3	I814	B3
F8008	C2	F838	A2	F8707	A3	I815	A3
F801	A3	F839	C2	F8708	A3	I816	A1
F802	A2	F840	A2	F8802	C2	I817	C1
F803	A1	F8401	A2	F8803	C2	I818	B1
F804	B3	F8402	A2	F8804	C2	I819	C1
F805	B3	F8403	A2	F8805	C2	I820	C1
F807	B3	F8406	A2	F8806	C2	I821	B3
F812	C2	F8407	A1	F8807	C2	I822	B3
F813	C2	F841	C2	F8808	C1	I823	A2
F814	C2	F842	C2	F901	A1	I824	A2
F815	C2	F843	B1	F902	A3	I825	C2
F816	C2	F844	A2	F903	A1	I903	B1
F817	C1	F845	A2	F904	A1	I904	B1
F818	C1	F846	A1	F905	A2	I905	B1
F819	A3	F847	B1	F906	A1	I906	B1
F820	B3	F848	A3	F907	B1	I907	C1
F821	A3	F849	A3	F908	A1	I908	B1
F822	B3	F850	B3	F909	B1		
F823	A3	F851	B3	F910	B1		
F824	B3	F852	C2	I801	C2		
F825	A3	F8603	C1	I802	C3		
F826	A3	F8604	A3	I803	C2		
F827	A2	F8606	C3	I804	B2		
F828	A2	F8607	C3	I805	A3		
F829	A2	F8608	C3	I806	A3		
F830	A2	F8609	C3	I807	A3		

Test points overview Digital Board Chrysalis F

F001	C2
F002	C2
F003	B2
F004	B2
F005	B2
F006	B2
F007	B2
F008	B2
F009	B2
F011	B2
F012	B2
F013	C2
F014	C2
F015	C2
F016	C2
F017	C2
F018	C2
F019	C2
F020	C2
F200	A3
F201	A2
F203	A2
F204	A3
F205	B3
F206	A3
F207	A3
F208	A3
F209	A3
F210	A3
F211	A3
F212	A3
F213	A3
F214	B3
F215	B3
F216	A3
F217	A3
F320	C5
F321	C5
F322	C5
F323	C5
F324	C5
F400	B4
F401	B4
F402	B4
F403	A2
F404	A2
F405	A3
F406	A4
F500	C3
F501	C3
F502	C3
F725	A1
F726	A1
F727	A3
F728	A2
F729	B3
F730	B2
F731	A3
F732	A3
F733	B2
F734	A3
F735	A3
F736	A1
F737	A1
F738	A2
F739	A2
F740	A2
F741	A2
F742	B2
F743	B1
F744	B1
F747	A2
F748	A2
F749	B1
F750	A1
F936	A5
F0001	C3
F0003	C4
F0005	C4
F0007	C4
F0009	C4
F0011	C4
F0015	C4
F0101	A5
F0102	B1
F0103	C5
F0104	C5
F0105	C5
F0106	C5
F0107	C5
F0108	C5
F0109	C5
F0110	C5
F0111	C5
F0112	C5
F0113	C5
F0114	C5
F0115	C5
F0116	C5
F0117	C5
F0118	C5
F0121	C5
F0123	C5
F0125	C5
F0127	C5
F0129	C5
F0131	C5
F0133	C5
F0135	C5
F0136	C5
F0137	C5
F0138	C5
F0139	C5
F0201	C3
F0202	C4
F0203	B3
F0204	C3
F0205	B3
F0206	C3
F0207	B3
F0208	C3
F0209	B3
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F0211	C3
F0212	C3
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F0214	C3
F0215	C4
F0216	C4
F0217	B4
F0218	C4
F0221	C4
F0223	C4
F0225	C4
F0227	C4
F0229	C4
F0231	C4
F0233	C4
F0234	C4
F0235	C4
F0236	C4
F0237	C4
F0238	C4
F0239	C4
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F0302	C2
F0303	C1
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F0305	C3
F0306	C2
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F0326	C2
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F0330	C2
F0401	B1
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F0403	B1
F0404	B1
F0405	C3
F0406	B1
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F0434	B3
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F0439	B3
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F0503	C3
F0506	C3
F0508	C3
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F0510	C3
F0511	C3
F0512	C3
F0514	C3
F0601	C2
F0603	C3
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F1402	A4
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F1409	A4
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F1415	A4
F1417	A4
F1419	A3
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F1423	A3
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F1706	B1
F1902	A1
F1903	A1
F1904	A1
F1907	A1
F1909	A1
F1911	A1
F1912	A1
F1914	A1
F1916	A1
F1918	A1
F1920	A1
F1921	A1
F1922	C5
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I006	C2
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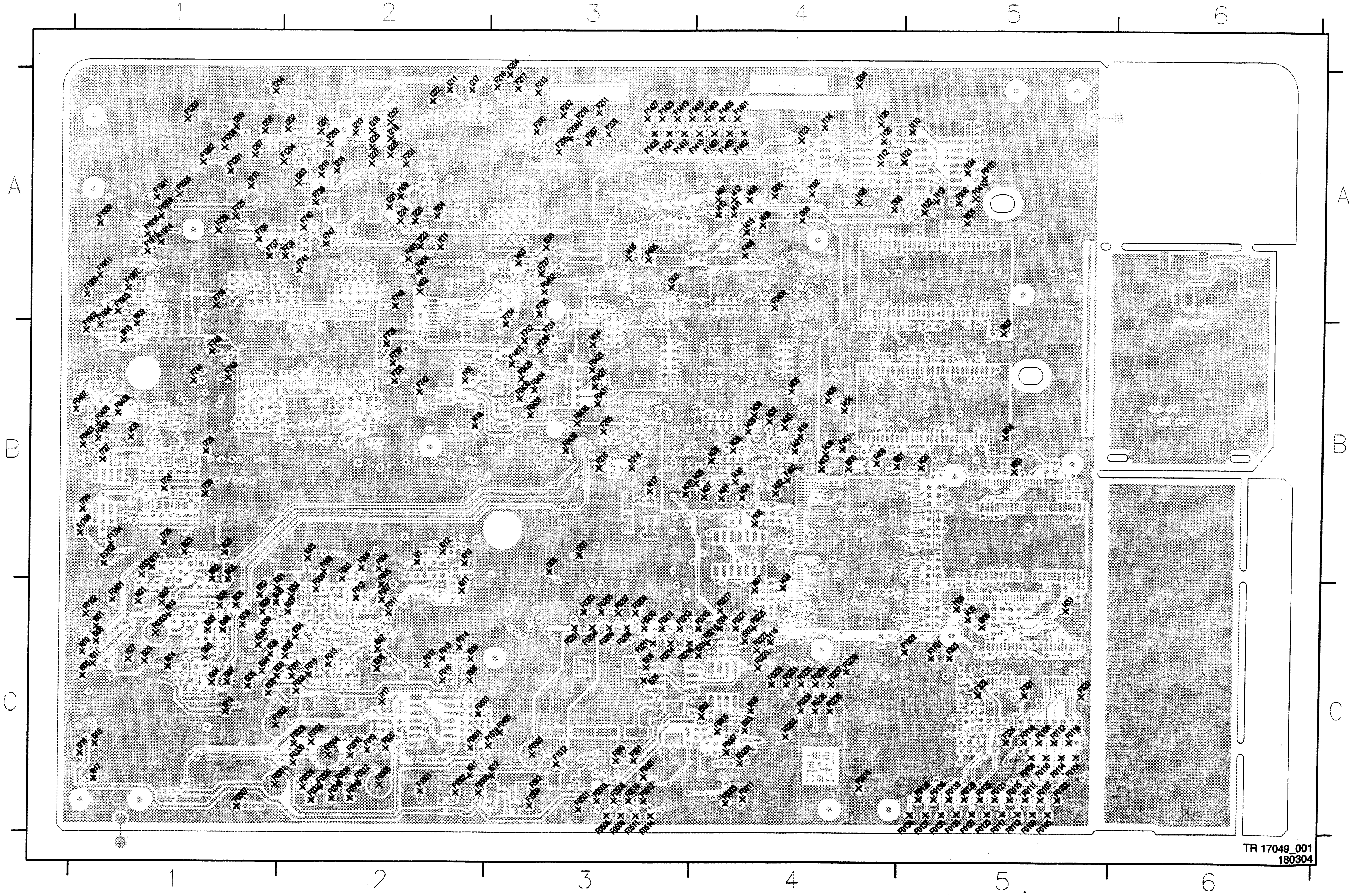
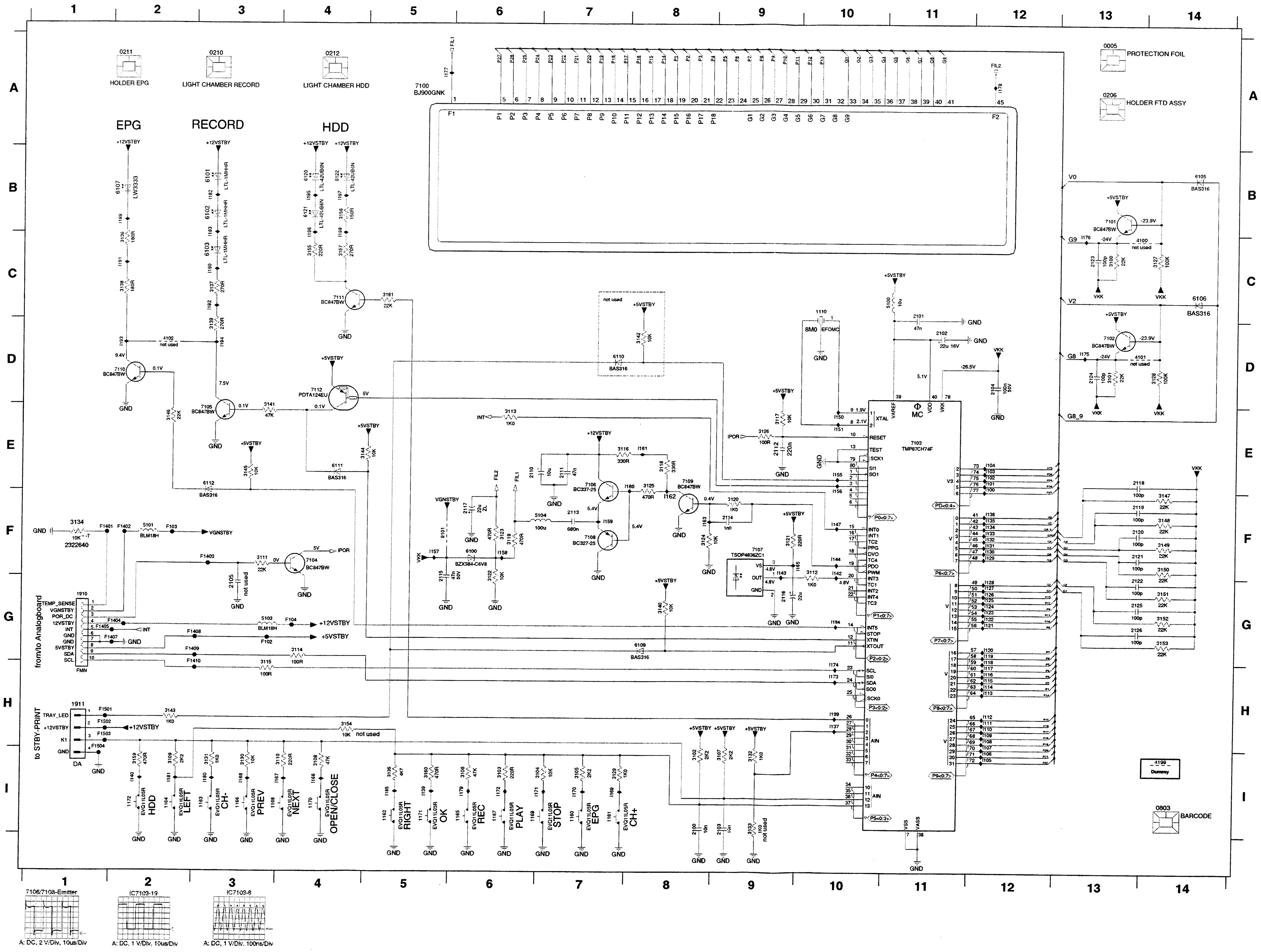
I008	C1
I009	C2
I010	B2
I011	B2
I012	B2
I100	B2
I102	A4
I105	B5
I106	B4
I108	A4
I109	A2
I110	A5
I111	A2
I112	A4
I114	A4
I116	C4
I117	C2
I119	A5
I120	A4
I121	A5
I122	A5
I123	A4
I124	A5
I125	A4
I200	B3
I201	A2
I202	A2
I203	A2
I204	A2
I205	A4
I206	B3
I207	A1
I208	A1
I209	A1
I210	A1
I211	A2
I212	A2
I213	A2
I214	A1
I215	A2
I216	A2
I217	A2
I218	A2
I219	A2
I220	A2
I221	A2
I222	A2
I223	A2
I224	A2
I225	A2
I226	A2
I227	A2
I300	A5
I303	A3
I305	A4
I306	A4
I402	A2
I403	A3
I404	B4
I405	B4
I406	B4
I407	A4
I408	A4
I409	A4
I410	A4
I411	A4
I412	A4
I413	B4
I414	A3
I415	A4
I416	A3
I417	B3
I418	B2
I419	B4
I420	B5
I421	B4
I422	B4
I423	B4
I424	B4
I425	B4
I426	B4
I427	B4
I428	B4
I429	B4
I430	B4
I431	B4
I432	B4
I433	B5
I434	B4
I435	B5
I436	B4
I437	B4
I438	B1
I439	B4
I500	C4
I501	C4
I502	C4
I503	C4
I504	C4
I505	C3
I506	C3
I507	C4
I508	C2
I509	C2
I510	A3
I511	C2
I512	C3
I724	B1
I725	B1
I726	B1
I727	B1
I728	B1
I729	B1
I800	B4
I801	B5
I802	A5
I803	B5
I804	B5
I805	A5
I806	C5
I807	B4
I900	C1
I901	C1
I902	B1
I903	C1
I904	C1
I905	B1
I906	C1
I907	C1
I908	C1
I909	A1
I910	C1
I911	C1
I912	B1
I913	B1
I914	C1
I915	C1
I916	C1
I917	C1
I918	A1
I919	C1
I920	C1
I921	B1
I922	B1
I923	B1
I924	B1
I925	B1
I926	B1
I927	C1
I928	B1
I929	C1
I930	B2
I931	B2
I932	B2
I933	B1
I934	C1
I935	C1
I936	C1
I937	C1
I938	C1
I939	C1
U1	B2



7. Circuit Diagrams and PWB Layouts

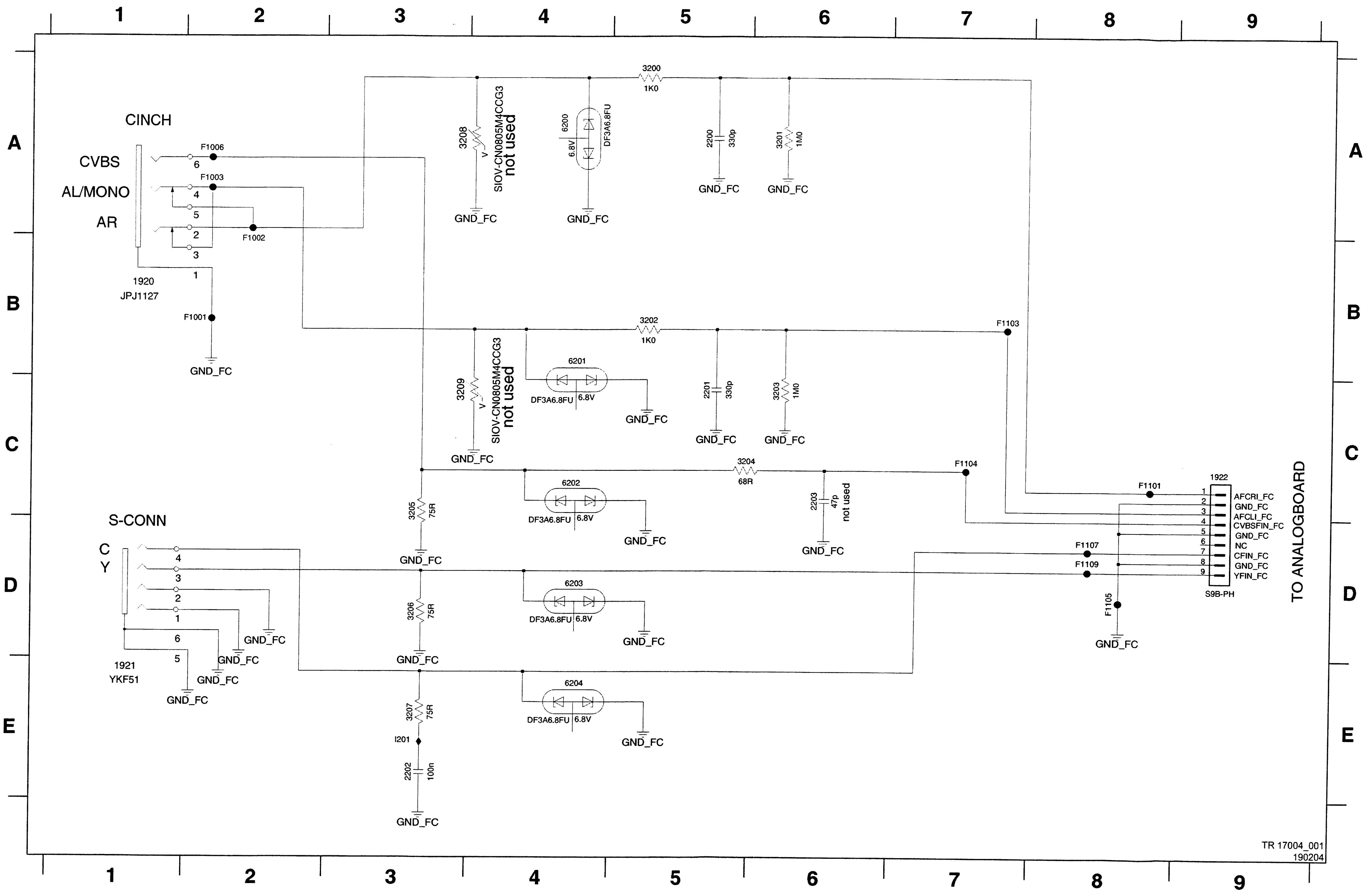
Display Panel


EPG
RECORD
HDD
HOLDER EPG
LIGHT CHAMBER RECORD
LIGHT CHAMBER HDD
PROTECTION FOIL
HOLDER FTD ASSY
7100 BJ900GNK
7103 TMP87CH74F
7107 TSOP4836ZC1
from/to Analogboard
to STBY-PRINT
TEMP_SENSE
VGNSTBY
POR_DC
12VSTBY
INT
GND
5VSTBY
SDA
SCL
TRAY_LED
+12VSTBY
K1
HDD
LEFT
CH-
PREV
NEXT
OPEN/CLOSE
RIGHT
OK
REC
PLAY
STOP
EPG
CH+
BARCODE
Dummy
7106/7103-Emitter
IC7103-19
IC7103-8
A: DC, 2 V/Div, 10us/Div
A: DC, 1 V/Div, 10us/Div
A: DC, 1 V/Div, 100ns/Div

0005	A13
0206	A13
0210	A3
0211	A2
0212	A4
1110	C10
1160	I7
1161	I7
1162	I5
1163	I3
1164	I2
1165	I6
1166	I3
1167	I6
1168	I3
1169	I6
1170	I4
1171	I5
1172	I2
1910	G1
1911	H1
2100	I8
2101	C11
2102	D11
2103	I9
2104	D12
2105	G3
2110	E6
2111	E7
2112	E9
2113	F7
2114	F9
2115	G5
2116	G9
2117	F6
2118	E13
2119	F13
2120	F13
2121	F13
2122	G13
2123	C13
2124	D13
2125	G13
2126	G13
3100	C13
3101	D13
3102	I8
3103	I6
3104	I7
3105	I7
3106	I6
3107	I9
3108	I4
3109	I2
3110	I4
3111	F3
3112	F10
3113	E6
3114	G4
3115	H3
3116	E7
3117	E9
3118	E8
3119	F6
3120	F9
3121	F9
3122	F6
3123	F6
3124	F8
3125	E8
3126	E9
3127	C14
3128	D14
3129	I7
3130	I3
3131	I3
3132	I9
3133	I9
3134	F1
3135	I5
3136	C2
3137	C3
3138	C2
3139	D3
3140	G8
3141	E3
3142	D8
3143	H2
3144	E4
3145	E3
3146	E2
3147	F14
3148	F14
3149	F14
3150	F14
3151	G14
3152	G14
3153	G14
3154	H4
3155	C4
3156	B4
3157	C4
3159	I2
3160	I5
3161	C5
4100	C13
4101	D13
4102	D2
4199	I14
5100	C11
5101	F2
5103	G3
5104	F7
6100	F6
6101	B3
6102	B3
6103	C3
6105	B14
6106	C14
6107	B2
6109	G8
6110	D7
6111	E4
6112	E3
6120	B4
6121	B4
6122	B4
7100	A5
7101	B13
7102	D13
7103	E11
7104	F4
7105	E3
7106	E7
7107	F9
7108	F7
7109	E8
7110	D2
7111	C4
7112	D4
9101	F5
F102	G3
F103	F2
F104	G4
F1401	F1
F1402	F2
F1403	F3
F1404	G2
F1405	G1
F1407	G2
F1408	G3
F1409	G2
F1410	H3
F1501	H1
F1502	H1
F1503	H1
F1504	I1
I100	E12
I101	E12
I102	E12
I103	E12
I104	E12
I105	I12
I106	I12
I107	H12
I108	H12
I109	H12
I110	H12
I111	H12
I112	H12
I113	H12
I114	H12
I115	H12
I116	H12
I117	H12
I118	G12
I119	G12
I120	G12
I121	G12
I122	G12
I123	G12
I124	G12
I125	G12
I126	G12
I127	G12
I128	G12
I129	F12
I130	F12
I131	F12
I132	F12
I133	F12
I134	F12
I135	F12
I136	F12
I137	H10
I139	I5
I140	I2
I142	F10
I143	F9
I144	F10
I147	F10
I150	E10
I151	E10
I155	E10
I156	E10
I157	F5
I158	F6
I159	F7
I160	E8
I161	E8
I162	F8
I163	F8
I165	F10
I166	I4
I167	I4
I168	I3
I169	I7
I170	I7
I171	I7
I172	I6
I173	H10
I174	H10
I175	D13
I176	C13
I177	A5
I178	A12
I179	I6
I180	I3
I181	I2
I182	B3
I183	C3
I184	G10
I185	I5
I189	B2
I190	C3
I191	C2
I192	C3
I193	D2
I194	D3
I195	B4
I196	C4
I197	B4
I198	C4
I199	H10

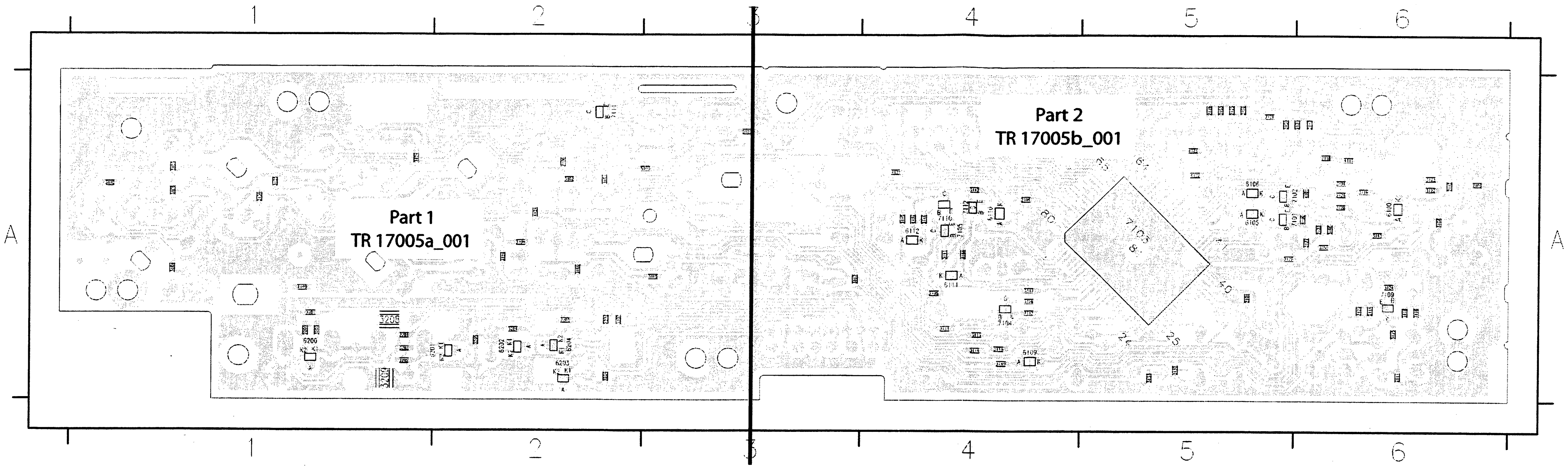
TR 17003_001
190204

Display Board Front Connector (FC)

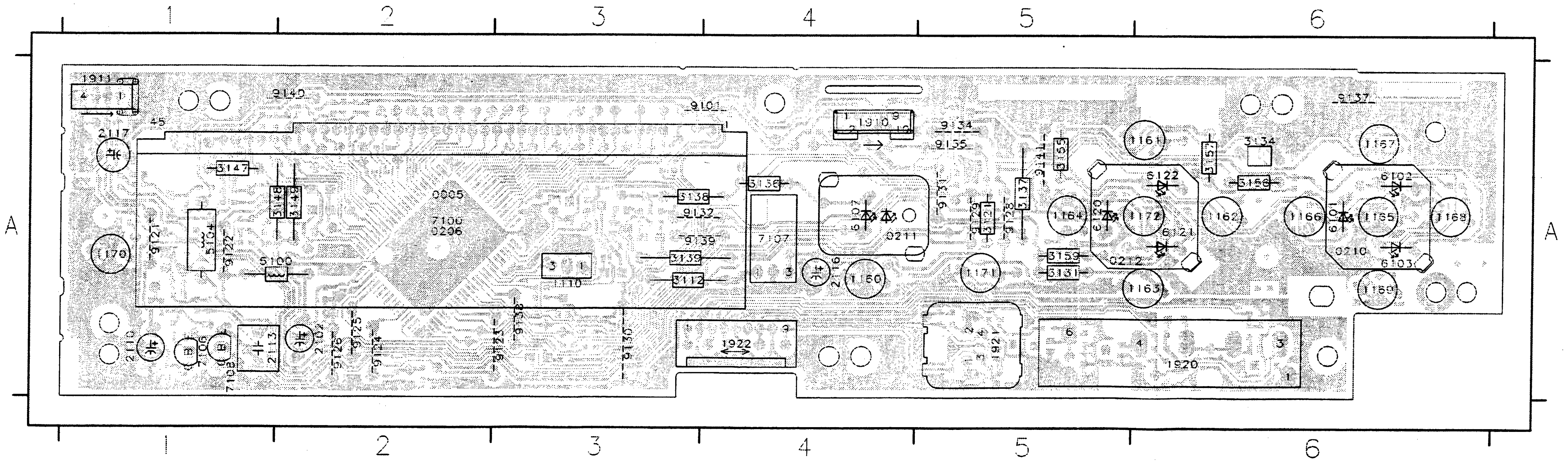

CINCH
CVBS
AL/MONO
AR
F1006
F1003
F1002
F1001
1920
JPJ1127
GND_FC
3208
SIOV-CN0805M4CCG3
not used
6200
6.8V
DF3A6.8FU
3200
1K0
2200
330p
3201
1M0
3202
1K0
F1103
3209
SIOV-CN0805M4CCG3
not used
6201
DF3A6.8FU
6.8V
2201
330p
3203
1M0
3204
68R
F1104
2203
47p
not used
6202
3205
75R
S-CONN
C
Y
1921
YKF51
3206
75R
6203
6204
3207
75R
I201
2202
100n
1922
AFCRI_FC
GND_FC
AFCLI_FC
CVBSFIN_FC
GND_FC
NC
CFIN_FC
GND_FC
YFIN_FC
S9B-PH
F1101
F1107
F1109
F1105
TO ANALOGBOARD
TR 17004_001
190204

1920	B1
1921	E1
1922	C9
2200	A5
2201	C5
2202	E3
2203	C6
3200	A5
3201	A6
3202	B5
3203	C6
3204	C5
3205	C3
3206	D3
3207	E3
3208	A3
3209	C3
6200	A4
6201	B4
6202	C4
6203	D4
6204	E4
F1001	B2
F1002	B2
F1003	A2
F1006	A2
F1101	C8
F1103	C8
F1104	C8
F1105	C8
F1107	D8
F1109	D8
I201	E3

Layouts Display Panel


1
2
3
4
5
6
A
Part 1
TR 17005a_001
Part 2
TR 17005b_001
7103
1
2
3
4
5
6
A

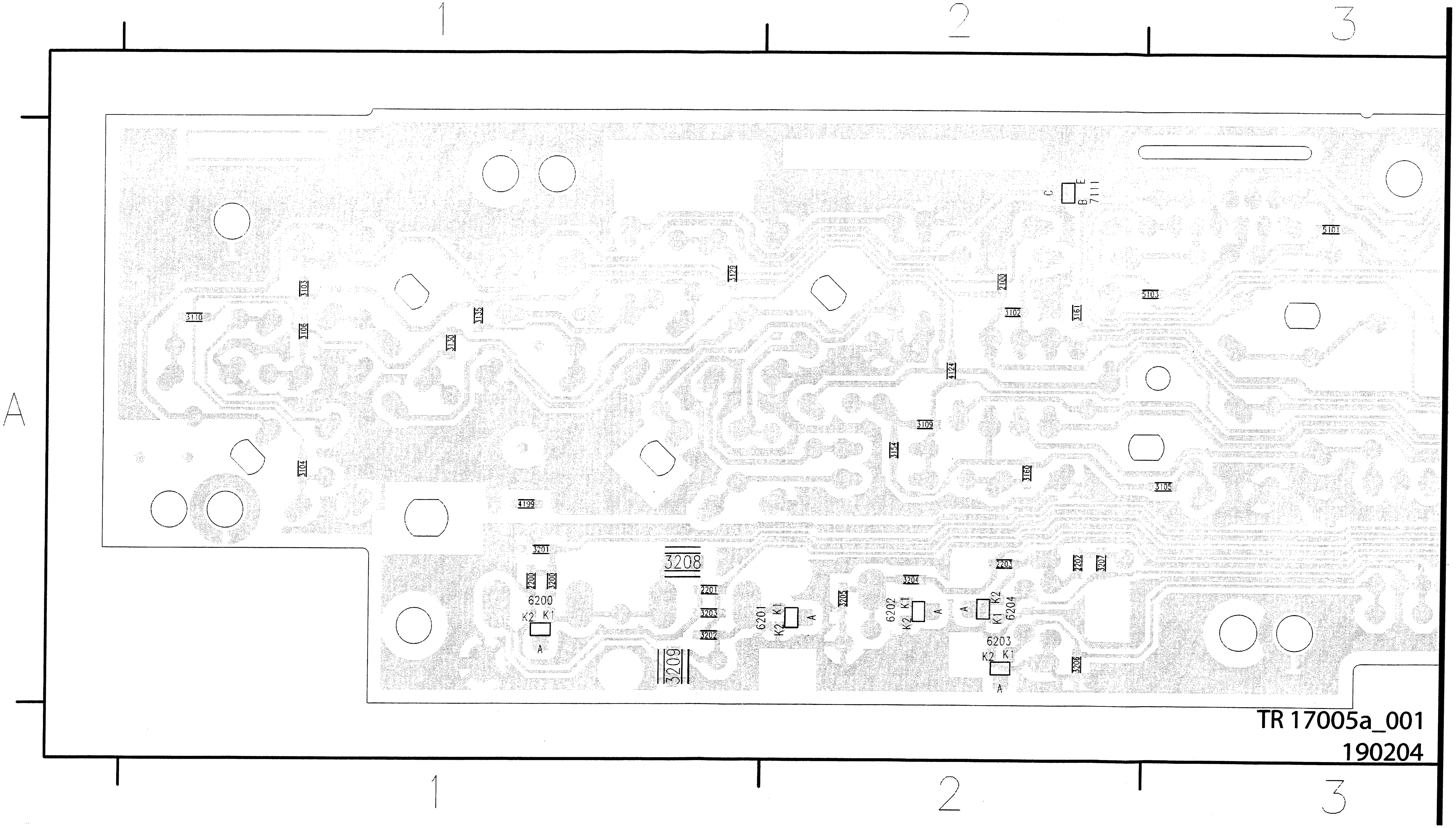
2100	A2
2101	A5
2103	A6
2104	A4
2105	A4
2111	A6
2112	A4
2114	A6
2115	A6
2118	A6
2119	A6
2120	A6
2121	A5
2122	A5
2123	A6
2124	A6
2125	A5
2126	A5
2200	A1
2201	A1
2202	A2
2203	A2
3100	A6
3101	A6
3102	A2
3103	A1
3104	A1
3105	A3
3106	A1
3107	A3
3108	A6
3109	A2
3110	A1
3111	A4
3113	A4
3114	A4
3115	A4
3116	A6
3117	A4
3118	A6
3119	A6
3120	A6
3122	A6
3123	A6
3124	A6
3125	A6
3126	A4
3127	A6
3128	A6
3129	A1
3130	A1
3132	A5
3133	A5
3135	A1
3140	A4
3141	A4
3142	A4
3143	A6
3144	A4
3145	A4
3146	A4
3150	A5
3151	A6
3152	A5
3153	A5
3154	A2
3160	A2
3161	A2
3200	A1
3201	A1
3202	A1
3203	A1
3204	A2
3205	A2
3206	A2
3207	A2
3208	A1
3209	A1
4100	A6
4101	A6
4102	A4
4111	A6
4121	A4
4122	AS
4123	AS
4124	A2
4199	A1
5101	A3
5103	A3
6100	A6
6105	AS
6106	AS
6109	A4
6110	A4
6111	A4
6112	A4
6200	A1
6201	A1
6202	A2
6203	A2
6204	A2
7101	AS
7102	AS
7103	AS
7104	A4
7105	A4
7109	A6
7110	A4
7111	A2
7112	A4


1
2
3
4
5
6
A
1911
9140
9101
1910
9134
9135
9137
2117
3147
3148
3149
0005
7100
0206
5104
9121
9122
1170
5100
1110
3136
3132
3139
3112
7107
6107
0211
2116
1160
3137
3153
1161
6122
3134
3156
1167
6102
1164
6120
1172
6121
1162
1166
6101
1165
1168
0212
0210
6103
3159
3131
1171
1163
1169
2110
7106
7108
2113
2102
9126
9125
9124
9123
9130
1922
1921
1920
1
2
3
4
5
6
A

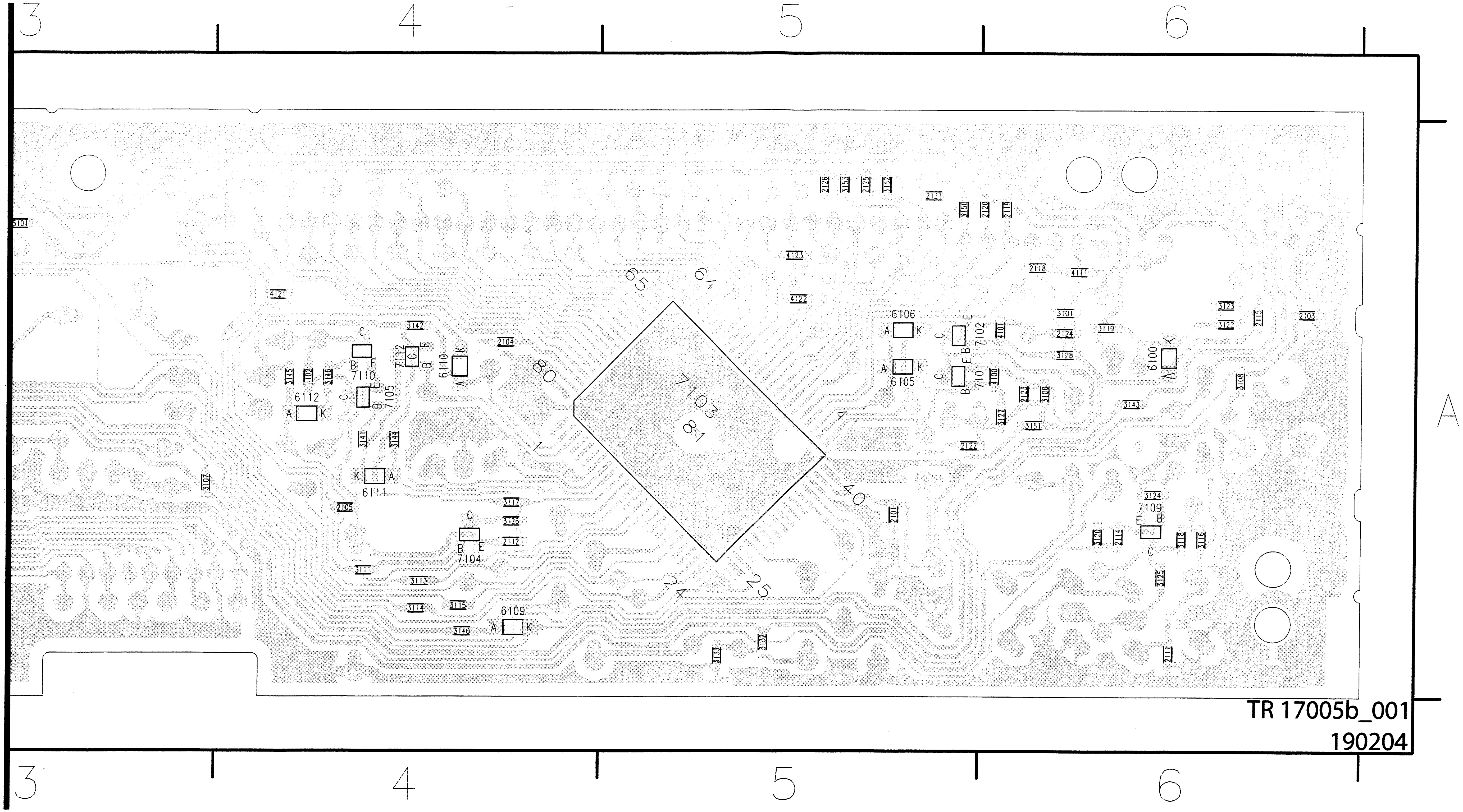
0005	A2
0206	A2
0210	A6
0211	A4
0212	A5
1110	A3
1160	A4
1161	A6
1162	A6
1163	A6
1164	A5
1165	A6
1166	A6
1167	A6
1168	A6
1169	A6
1170	A 1
1171	A5
1172	A6
1910	A4
1911	A1
1920	A6
1921	A5
1922	A4
2102	A2
2110	A1
2113	A1
2116	A4
2117	A1
3112	A3
3121	A5
3131	A5
3134	A6
3136	A4
3137	A5
3138	A3
3139	A3
3147	A1
3148	A2
3149	A2
3155	A5
3156	A6
3157	A6
3159	A5
5100	A1
5104	A1
6101	A6
6102	A6
6103	A6
6107	A4
6120	A5
6121	A6
6122	A6
7100	A2
7106	A1
7107	A4
7108	A1
9101	A4
9121	A1
9122	A1
9123	A3
9124	A2
9125	A2
9126	A2
9128	A5
9129	A5
9130	A3
9131	A5
9132	A3
9134	A5
9135	A5
9137	A6
9138	A3
9139	A3
9140	A2
9141	A5

TR 17005_001
190204

Layout Display Panel (Part 1 Bottom View)

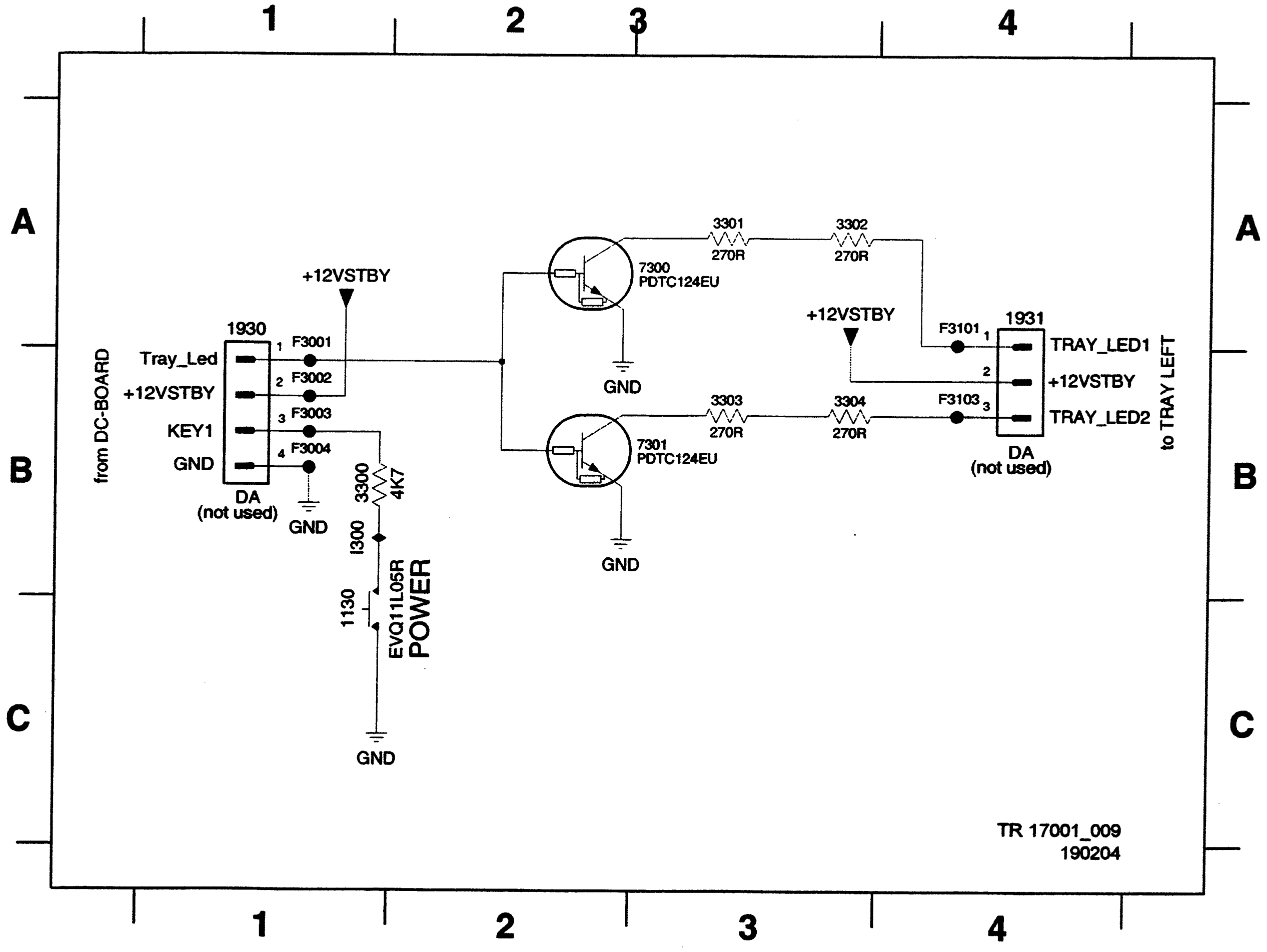

1
2
3
A
7111
C
B
E
5101
5103
3100
3102
3161
3129
3135
3130
3103
3110
3106
3104
4124
3109
3154
3160
3105
4199
3201
3208
2200
3200
6200
K2
K1
A
2201
3203
3202
3209
6201
3205
6202
3204
2203
6204
6203
2202
3207
3206
TR 17005a_001
190204

Layout Display Panel (Part 2 Bottom View)

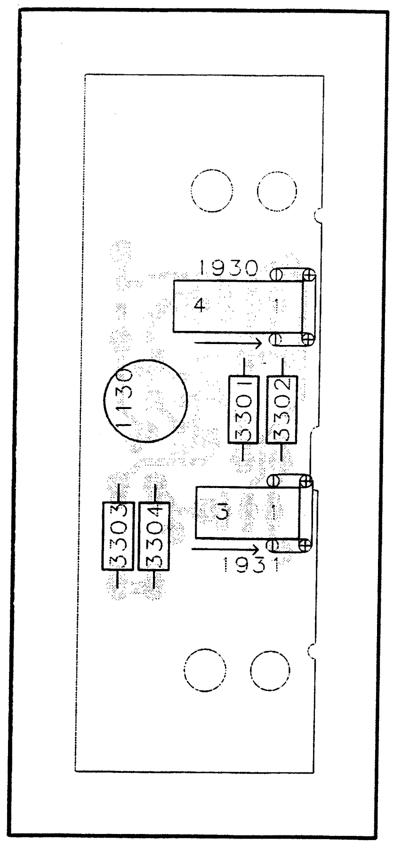

3
4
5
6
A
7103
7101
7102
7104
7105
7109
7110
7112
6100
6105
6106
6109
6110
6111
6112
TR 17005b_001
190204

Standby Panel (STBY)

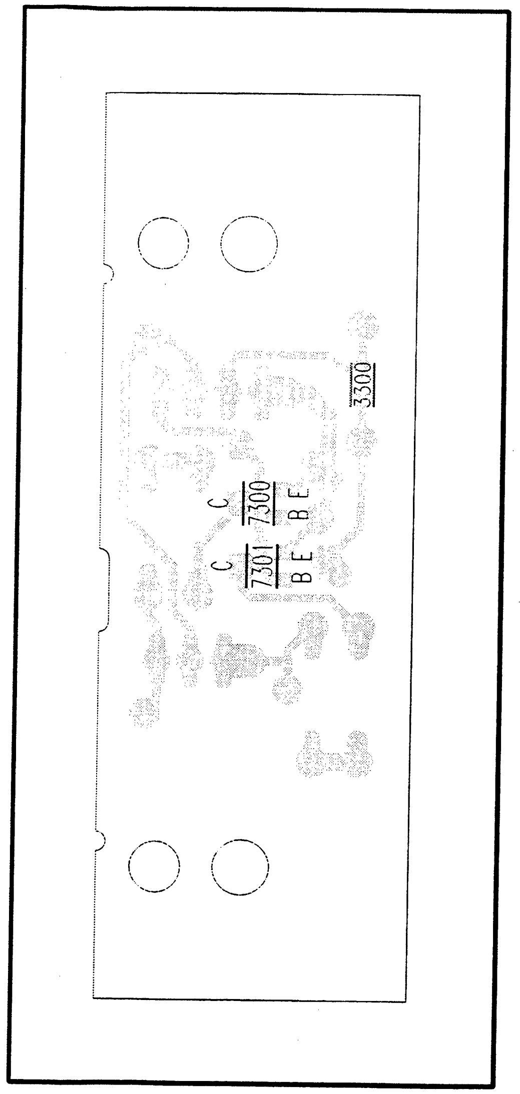
1130 C1	1931 A4	3301 A3	3303 B3	7300 A3	F3001 A1	F3003 B1	F3101 A4	I300 B1
1930 A1	3300 B1	3302 A3	3304 B3	7301 B3	F3002 B1	F3004 B1	F3103 B4	


1
2
3
4
A
B
C
from DC-BOARD
1930
Tray_Led
+12VSTBY
KEY1
GND
DA
(not used)
1
2
3
4
F3001
F3002
F3003
F3004
GND
+12VSTBY
3300
4K7
I300
1130
EVQ11L05R
POWER
GND
7300
PDTC124EU
GND
7301
PDTC124EU
GND
3301
270R
3302
270R
3303
270R
3304
270R
+12VSTBY
F3101
F3103
1931
TRAY_LED1
+12VSTBY
TRAY_LED2
DA
(not used)
to TRAY LEFT
TR 17001_009
190204

Layout Standby Panel


1930
4
1
1130
3301
3302
3303
3304
3
1
1931

1130 A1
1930 A1
1931 A1
3301 A1
3302 A1
3303 A1
3304 A1

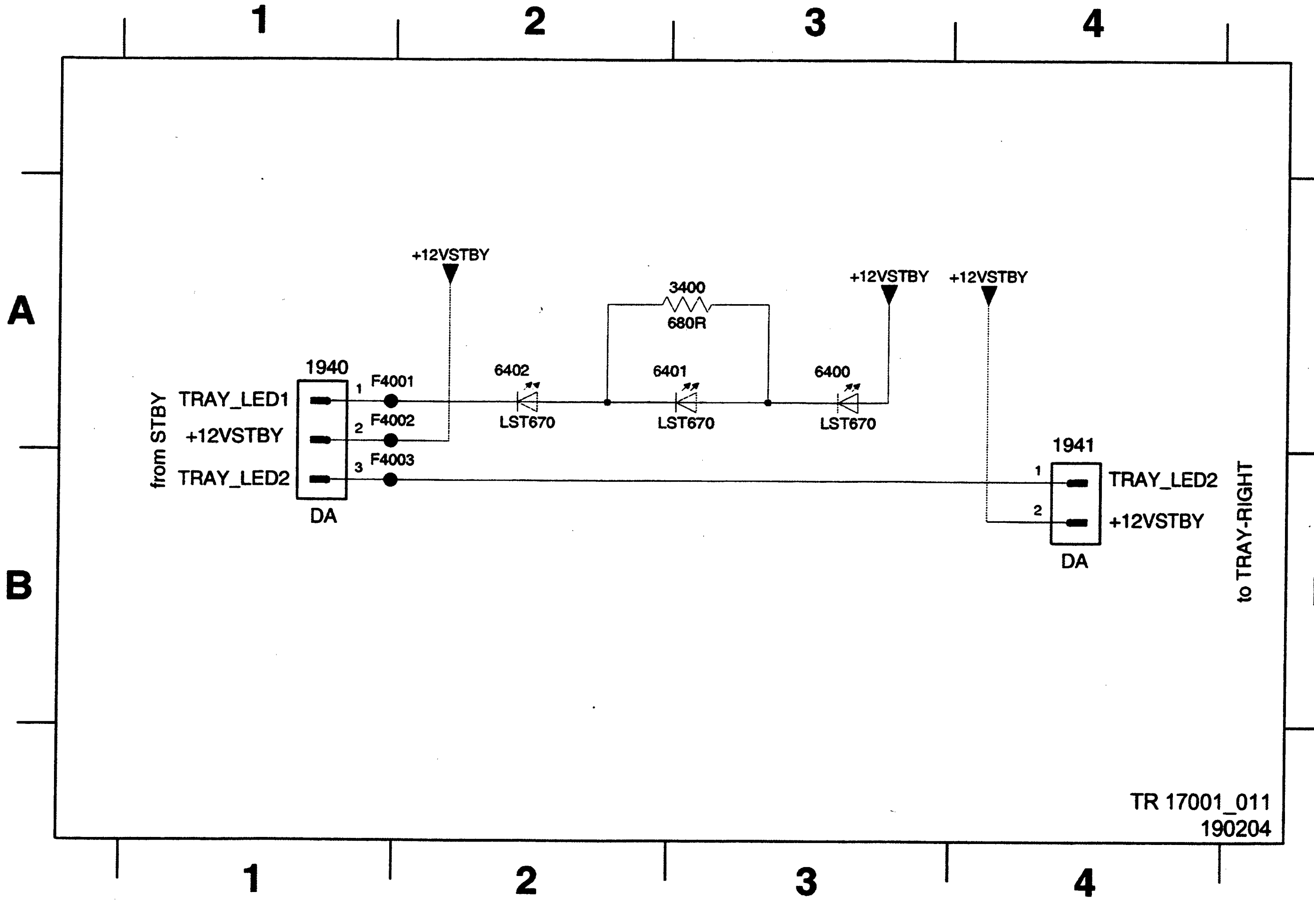

3300
C
7300
B E
C
7301
B E

3300 A1
7300 A1
7301 A1

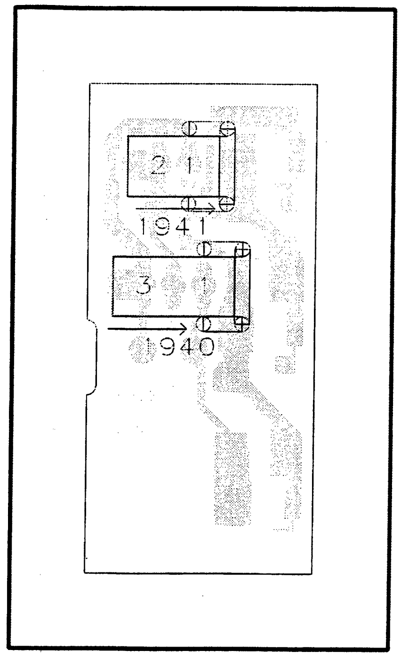
TR 17010_001
190204

Tray Left Panel (TRL)

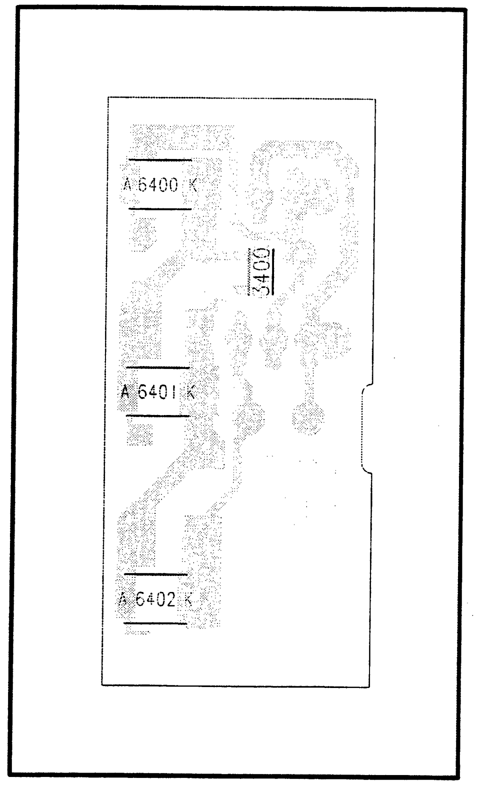
1940 A1 1941 B4 3400 A3 6400 A3 6401 A3 6402 A2 F4001 A1 F4002 A1 F4003 B1


1
2
3
4
A
B
+12VSTBY
3400
680R
+12VSTBY
+12VSTBY
1940
F4001
F4002
F4003
1
2
3
from STBY
TRAY_LED1
+12VSTBY
TRAY_LED2
DA
6402
LST670
6401
LST670
6400
LST670
1941
1
2
TRAY_LED2
+12VSTBY
DA
to TRAY-RIGHT
TR 17001_011
190204

Layout Tray Left Panel


2 1
1941
3 1
1940

1940 A1
1941 A1

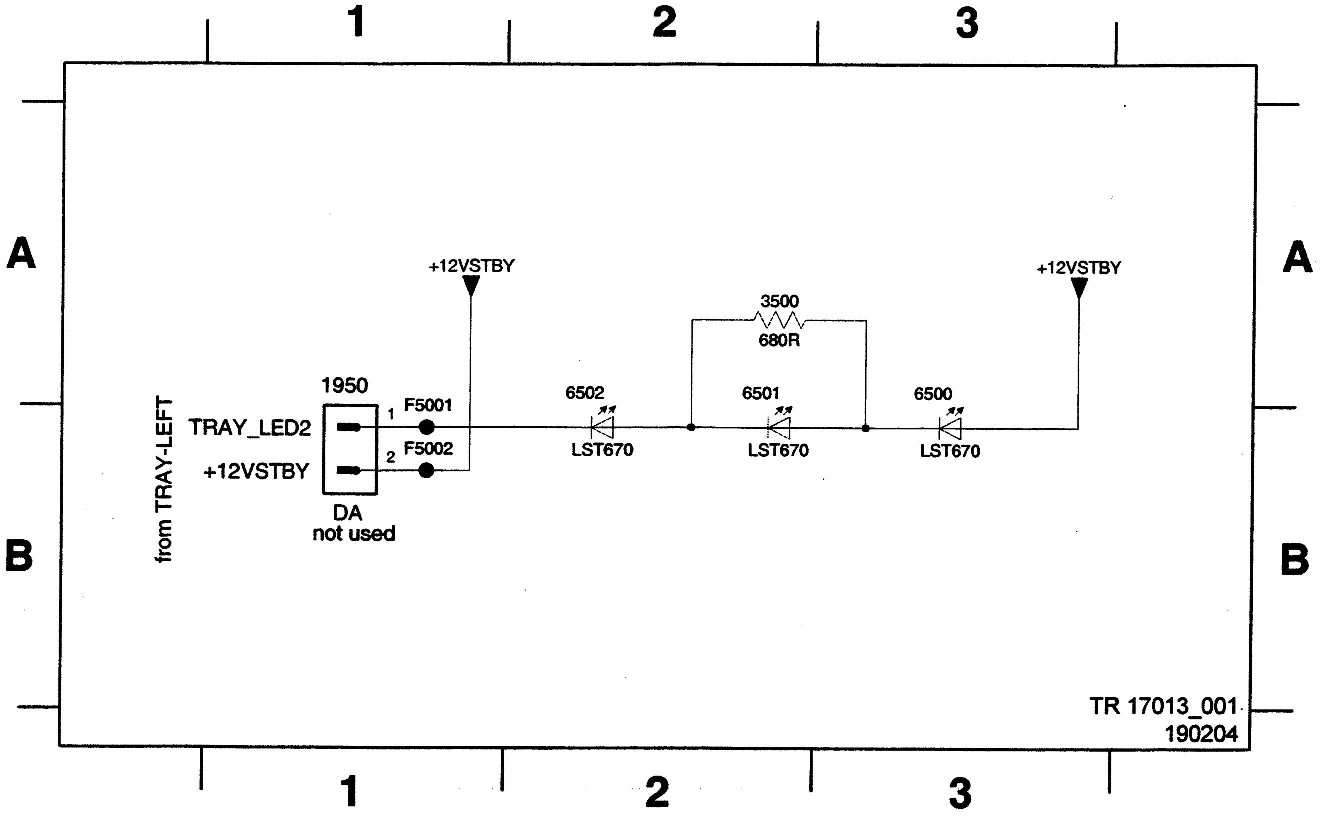

A 6400 K
3400
A 6401 K
A 6402 K

3400 A1
6400 A1
6401 A1
6402 A1

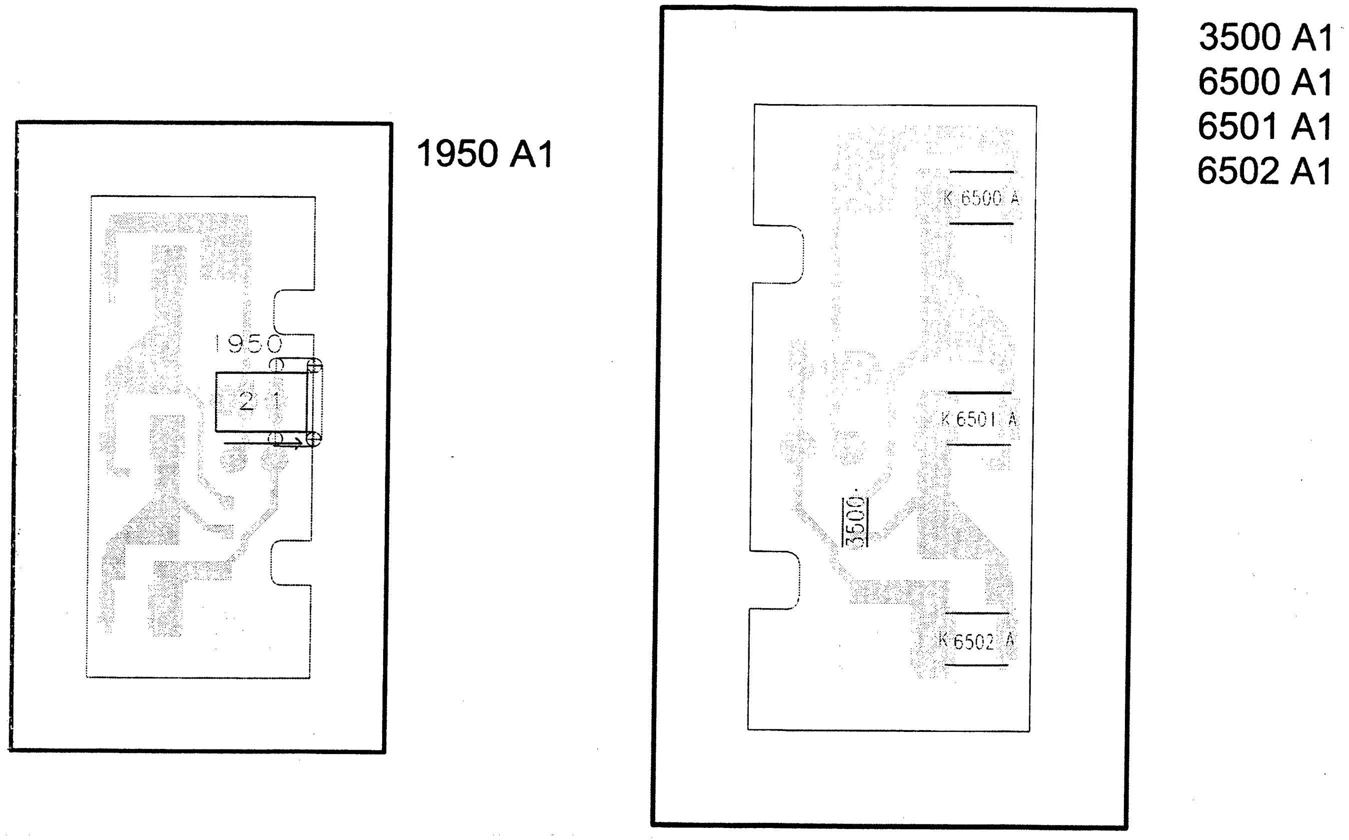
TR 17012_001
190204

Tray Right Panel (TRR)

1950 A1 3500 A2 6500 A3 6501 A2 6502 A2 F5001 B1 F5002 B1


1
2
3
A
B
+12VSTBY
3500
680R
+12VSTBY
1950
TRAY_LED2
+12VSTBY
from TRAY-LEFT
1
2
F5001
F5002
DA
not used
6502
LST670
6501
LST670
6500
LST670
TR 17013_001
190204

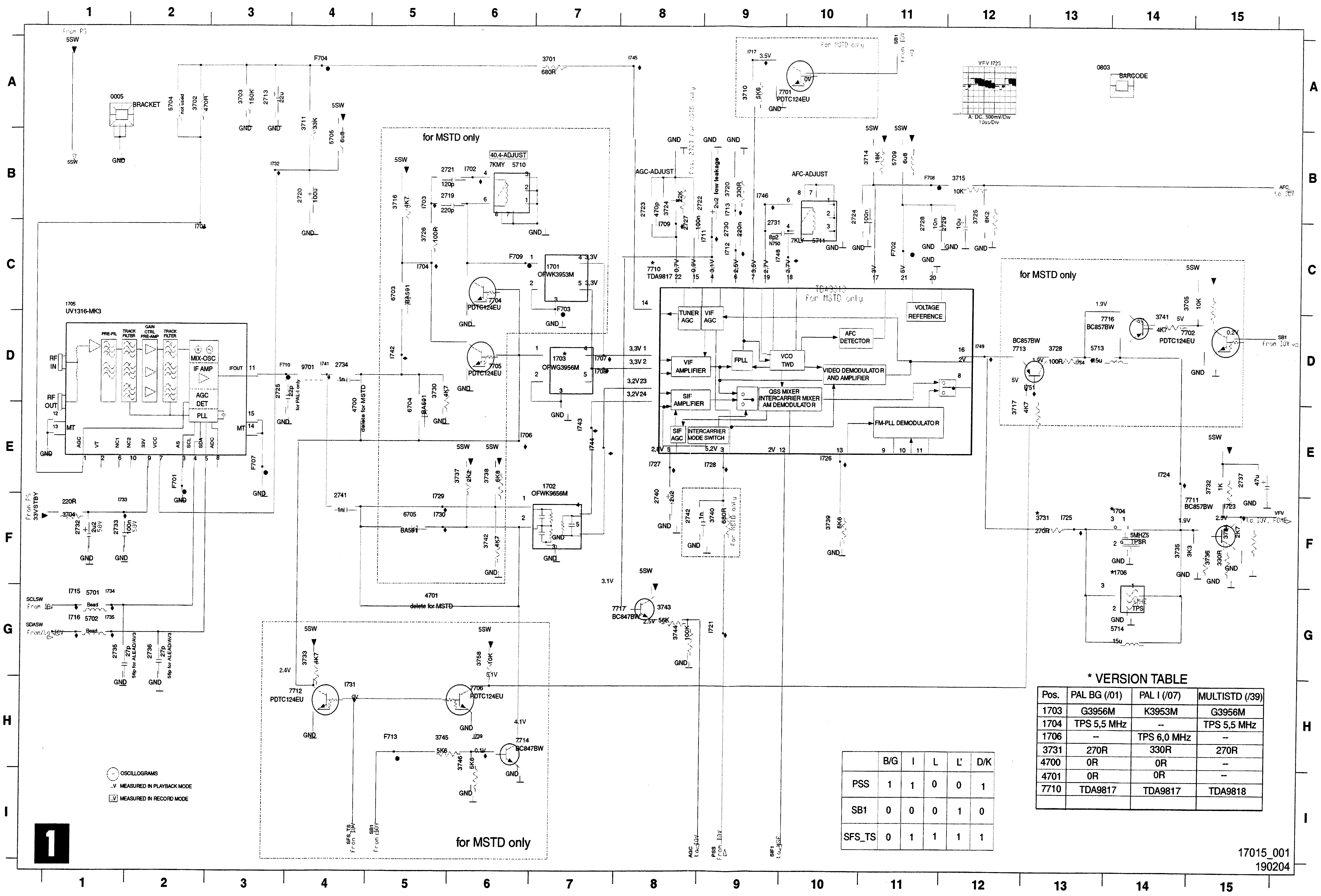
Layout Tray Right Panel


1950 A1
1950
2 1
3500 A1
6500 A1
6501 A1
6502 A1
K 6500 A
K 6501 A
3500
K 6502 A

TR 17014_001
190204

Analog Board: Frontend Video (FV)

0005 A1
0803 A13
1701 C7
1702 E7
1703 D7
1704 F14
1705 C1
1706 F14
2713 A3
2719 B5
2720 B4
2721 B5
2722 B8
2723 B8
2724 B10
2725 D3
2727 C8
2728 C11
2729 C12
2730 C9
2731 C9
2732 F1
2733 F1
2734 D4
2735 G1
2736 G2
2737 E15
2740 F8
2741 F4
2742 F8
3701 A7
3702 A2
3703 A3
3704 F1
3705 C14
3710 A9
3711 A4
3714 B11
3715 B12
3716 B5
3717 E12
3720 B9
3724 B8
3725 B12
3726 C5
3728 D13
3730 D5
3731 F13
3732 E15
3733 G4
3734 F15
3735 F14
3736 F15
3737 E6
3738 E6
3739 F10
3740 F9
3741 D14
3742 F6
3743 G8
3744 G8
3745 H5
3746 H6
3758 G6
4700 E4
4701 G5
5701 G1
5702 G1
5704 A2
5705 B4
5709 B11
5710 B6
5711 C10
5713 D13
5714 G14
6703 C5
6704 E5
6705 F5
7701 A10
7702 D15
7704 C6
7705 D6
7706 H6
7710 C8
7711 F14
7712 H4
7713 D12
7714 H6
7716 D14
7717 G7
9701 D4
F701 E2
F702 C11
F703 D7
F704 A4
F707 E3
F708 B11
F709 C6
F710 D3
F713 H5
I701 C2
I702 B6
I703 B5
I704 C5
I706 E6
I707 D7
I708 D7
I709 C8
I711 C9
I712 C9
I713 B9
I715 G1
I716 G1
I717 A9
I721 G9
I723 F15
I724 E14
I725 F13
I726 E10
I727 E8
I728 E9
I729 F5
I730 F5
I731 H4
I732 B3
I733 F1
I734 G1
I735 G1
I739 H6
I741 D4
I742 D5
I743 E7
I744 E7
I745 A8
I746 B9
I748 C9
I749 D12
I751 D13
I754 D13



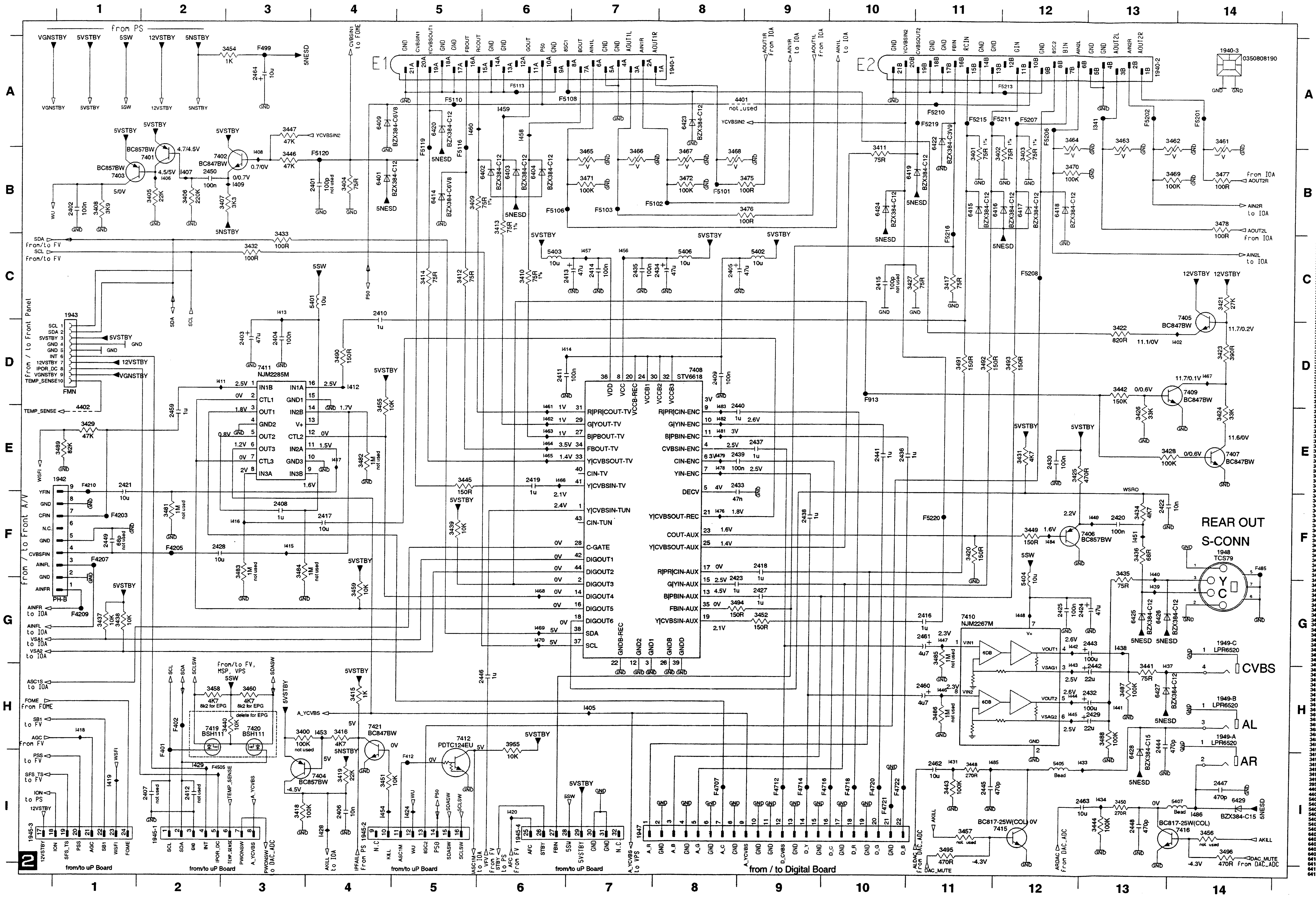
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
I
From PS
5SW
0005
BRACKET
0803
BARCODE
for MSTD only
40.4-ADJUST
7KMY
AGC-ADJUST
AFC-ADJUST
7KLY
low leakage
1705
UV1316-MK3
PRE-FIL
TRACK FILTER
GAIN CTRL PRE-AMP
TRACK FILTER
MIX-OSC
IF AMP
AGC DET
PLL
RF IN
RF OUT
IFOUT
1701
OFWK3953M
1703
OFWG3956M
1702
OFWK9656M
7704
PDTC124EU
7705
PDTC124EU
7701
PDTC124EU
7710
TDA9817
TUNER AGC
VIF AGC
VIF AMPLIFIER
SIF AMPLIFIER
FPLL
VCO TWD
AFC DETECTOR
VOLTAGE REFERENCE
VIDEO DEMODULATOR AND AMPLIFIER
QSS MIXER INTERCARRIER MIXER AM DEMODULATOR
FM-PLL DEMODULATOR
SIF AGC
INTERCARRIER MODE SWITCH
7716
BC857BW
7713
BC857BW
7702
PDTC124EU
7711
BC857BW
7717
BC847BW
7712
PDTC124EU
7706
PDTC124EU
7714
BC847BW
5MHZ5 TPSR
5714
TPS
delete for MSTD
delete for MSTD
for PAL-I only
SCLSW
SDASW
From PS 33VSTBY
AFC to IOV
VFV to IOV, FCM
SB1 From IOV
AGC
PSS
SIF1
SFS_TS
SB1
VFV I723
A: DC: 500mV/Div 10us/Div
OSCILLOGRAMS
..V MEASURED IN PLAYBACK MODE
..V MEASURED IN RECORD MODE
1
17015_001
190204

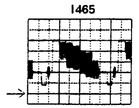
* VERSION TABLE

Pos.	PAL BG (/01)	PAL I (/07)	MULTISTD (/39)
1703	G3956M	K3953M	G3956M
1704	TPS 5,5 MHz	--	TPS 5,5 MHz
1706	--	TPS 6,0 MHz	--
3731	270R	330R	270R
4700	0R	0R	--
4701	0R	0R	--
7710	TDA9817	TDA9817	TDA9818

	B/G	I	L	L'	D/K
PSS	1	1	0	0	1
SB1	0	0	0	1	0
SFS_TS	0	1	1	1	1

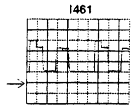
Analog Board: In/Out Video (IOV)


from PS
VGNSTBY
5VSTBY
5SW
12VSTBY
5NSTBY
5NESD
E1
E2
1940-1
1940-2
1940-3
0350808190
CVBSIN1 to FOME
BC857BW 7401
BC857BW 7403
BC847BW 7402
NJM2285M 7411
STV6618 7408
NJM2267M 7410
BC847BW 7405
BC847BW 7409
BC847BW 7407
BC857BW 7406
BC847BW 7421
BC857BW 7404
PDTC124EU 7412
BSH111 7419
BSH111 7420
BC817-25W(COL) 7415
BC817-25W(COL) 7416
BZX384-C12
BZX384-C6V8
BZX384-C3V9
BZX384-C15
1943 FMN
1942 PH-B
1948 TCS79
REAR OUT S-CONN
1949-C LPR6520 CVBS
1949-B LPR6520 AL
1949-A LPR6520 AR
SDA from/to FV
SCL from/to FV
from / to Front Panel
from / to Front A/V
TEMP_SENSE
AINFR to IOA
AINFL to IOA
VSA1 to IOA
VSA2 to IOA
ASC1S to IOA
FOME from FOME
SB1 to FV
AGC from FV
PSS to FV
SFS_TS to FV
ION to PS
from/to FV, MSP, VPS
A_YCVBS
from/to uP Board
from / to Digital Board
AOUT2R from IOA
AIN2R to IOA
AOUT2L from IOA
AIN2L to IOA
DAC_MUTE
from DAC_ADC
AKILL
1945-1
1945-2
1945-3
1945-4
1947
2
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I



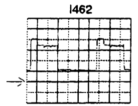
I465

A:DC, 500mV/Div 10us/Div



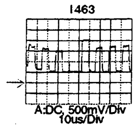
I461

A:DC, 500mV/Div 10us/Div



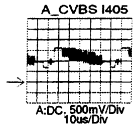
I462

A:DC, 500mV/Div 10us/Div



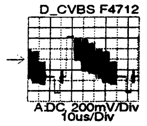
I463

A:DC, 500mV/Div 10us/Div



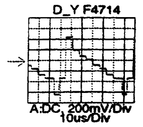
A_CVBS I405

A:DC, 500mV/Div 10us/Div



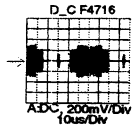
D_CVBS F4712

A:DC, 200mV/Div 10us/Div



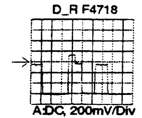
D_Y F4714

A:DC, 200mV/Div 10us/Div



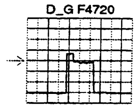
D_C F4716

A:DC, 200mV/Div 10us/Div



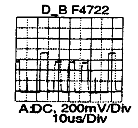
D_R F4718

A:DC, 200mV/Div 10us/Div



D_G F4720

A:DC, 200mV/Div 10us/Div



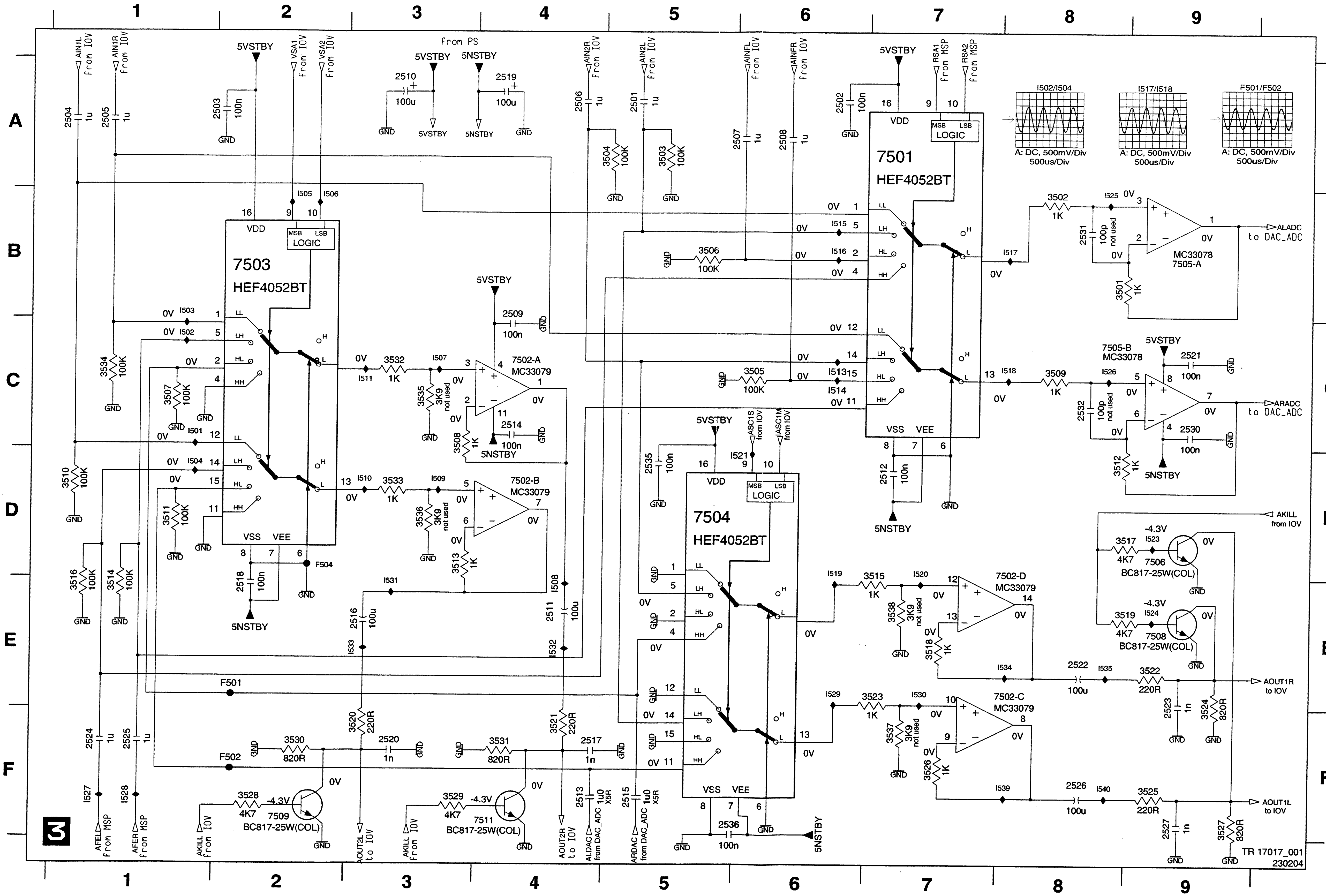
D_B F4722

A:DC, 200mV/Div 10us/Div

1940-1	A8
1940-2	A13
1940-3	A14
1942	E1
1943	C1
1945-1	I2
1947	I7
1948	F14
1949-A	I14
1949-B	H14
1949-C	G14
2401	B4
2402	B1
2403	D3
2404	D3
2405	C8
2406	I4
2407	I2
2408	F3
2409	D8
2410	C4
2411	D6
2412	I2
2413	C6
2414	C7
2415	C10
2416	G11
2417	F4
2418	F9
2419	E6
2420	F13
2421	E1
2422	F13
2423	G8
2424	G13
2425	G12
2427	G9
2428	F2
2429	H13
2430	E12
2432	H13
2433	E8
2434	C8
2435	C7
2436	E10
2437	E9
2438	F9
2439	E8
2440	E8
2441	E10
2442	H13
2443	G13
2444	H13
2445	I11
2446	H6
2447	I14
2448	I13
2449	F1
2450	B2
2459	E2
2460	H11
2461	G11
2462	I11
2463	I13
2464	A3
3400	H3
3401	B11
3402	B11
3403	B12
3404	B4
3405	B2
3406	B2
3407	B2
3408	B1
3409	B5
3410	C6
3411	B10
3412	C5
3413	B6
3414	C5
3415	H4
3416	H4
3417	C11
3418	I3
3419	I4
3420	F11
3421	C14
3422	D13
3423	D14
3424	E14
3425	E12
3426	E13
3427	C10
3428	E13
3429	E1
3431	E12
3432	C3
3433	C3
3434	F13
3435	F13
3436	F13
3437	G1
3438	G1
3439	F5
3440	H3
3441	H13
3442	D13
3443	I11
3444	I13
3445	E5
3446	B3
3447	A3
3448	I11
3449	F12
3450	I13
3451	I4
3452	G9
3454	A3
3455	E4
3456	I14
3457	I11
3458	H2
3459	G4
3460	H3
3461	A14
3462	A13
3463	A13
3464	A12
3465	B7
3466	B7
3467	B8
3468	B8
3469	B13
3470	B12
3471	B7
3472	B8
3475	B9
3476	B9
3477	B14
3478	B14
3481	F2
3482	E4
3483	F3
3484	F3
3485	G11
3486	H11
3487	H13
3488	H13
3489	E1
3490	D4
3491	D11
3492	D11
3493	D12
3494	G8
3495	I11
3496	I14
3955	H6
4401	A8
4402	E1
5401	C4
5402	C9
5403	C6
5404	G12
5405	I12
5406	C8
5407	I14
6401	B4
6402	B6
6403	B6
6404	B6
6409	A4
6414	B5
6415	B11
6416	B11
6417	B12
6418	B12
6419	B10
6420	A5
6422	A11
6423	A8
6424	B10
6425	G13
6426	G13
6427	H13
6428	I13
6429	I14
7401	B2
7402	B3
7403	B1
7404	I4
7405	C14
7406	F12
7407	E14
7408	D8
7409	D14
7410	G11
7411	D3
7412	H5
7415	I12
7416	I14
7419	H2
7420	H3
7421	H4
F401	I2
F402	H2
F412	I5
F4203	F1
F4205	F2
F4207	F1
F4209	G1
F4210	E1
F4505	I2
F4707	I8
F4712	I9
F4714	I9
F4716	I10
F4718	I10
F4720	I10
F4721	I10
F4722	I10
F485	F14
F499	A3
F5101	B8
F5102	B7
F5103	B7
F5106	B6
F5108	A6
F5110	A5
F5113	A6
F5116	B5
F5119	B5
F5120	B4
F5201	A14
F5202	A13
F5206	A12
F5207	A12
F5208	C12
F5210	A11
F5211	A12
F5213	A12
F5215	A11
F5216	C11
F5219	A11
F5220	F11
F913	D10
I341	A13
I402	D14
I405	H7
I406	B2
I407	B2
I408	B3
I409	B3
I411	D2
I412	D4
I413	C3
I414	D6
I415	F3
I416	F3
I417	E4
I418	H1
I419	I1
I420	I6
I424	I5
I428	I4
I429	I2
I431	I11
I433	I13
I434	I13
I437	H13
I438	G13
I439	G13
I440	F13
I441	H13
I442	G12
I443	H12
I444	H12
I445	H12
I446	H11
I447	G11
I448	G12
I449	F13
I451	F13
I453	H4
I454	I4
I456	C7
I457	C7
I458	A6
I459	A6
I460	A5
I461	E6
I462	E6
I463	E6
I464	E6
I465	E6
I466	E6
I467	D14
I468	G6
I469	G6
I470	G6
I476	F8
I478	E8
I479	E8
I481	E8
I482	E8
I483	E8
I484	F12
I485	I11
I486	I14

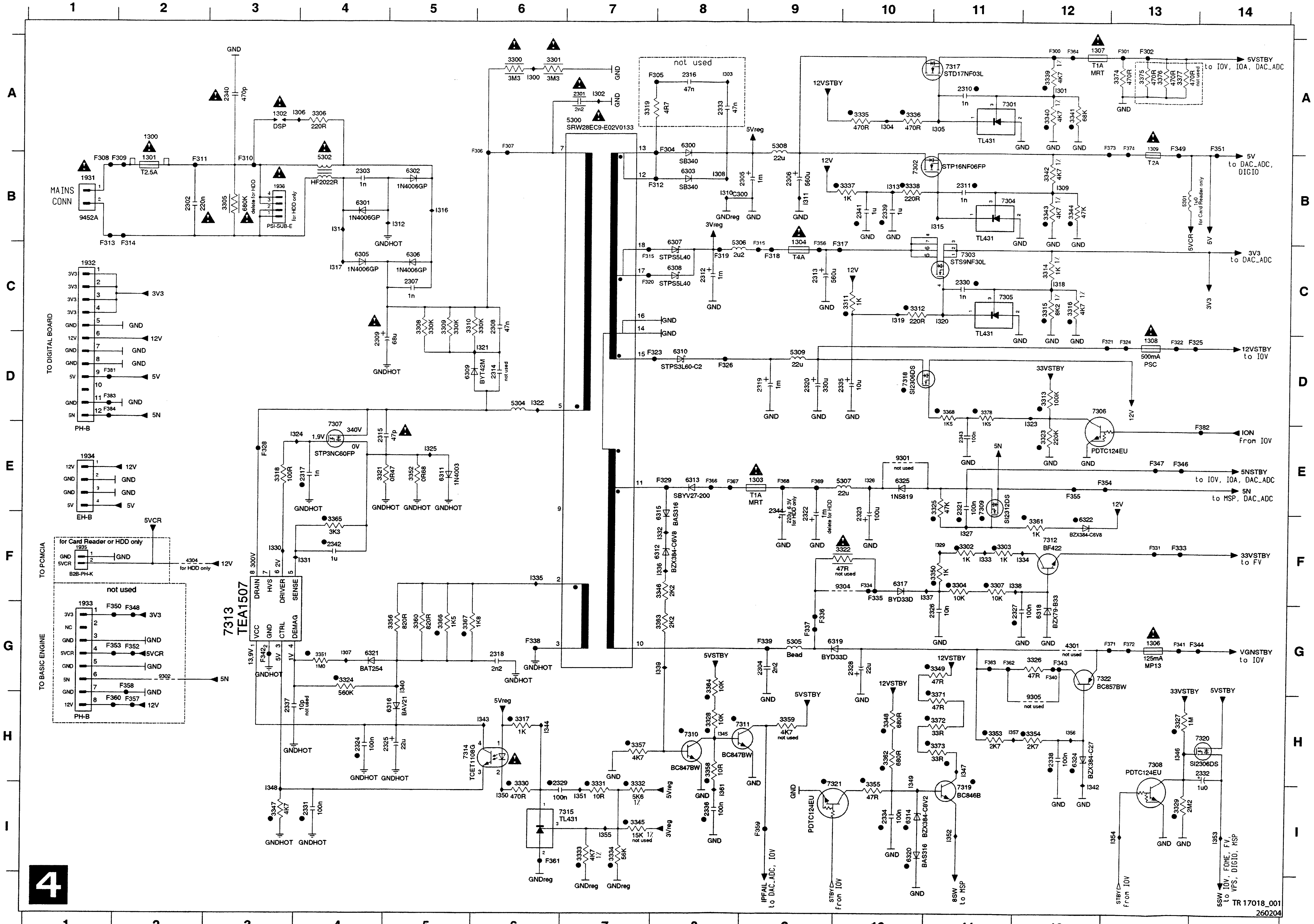
17016_001
190204

Analog Board: IN/Out Audio (IOA)


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
AIN1L from IOV
AIN1R from IOV
5VSTBY
VSA1 from IOV
VSA2 from IOV
from PS
5VSTBY
5NSTBY
2510
100u
2519
100u
AIN2R from IOV
AIN2L from IOV
AINFL from IOV
AINFR from IOV
RSA1 from MSP
RSA2 from MSP
2504 1u
2505 1u
2503 100n
2506 1u
2501 1u
2507 1u
2508 1u
2502 100n
3504 100K
3503 100K
GND
7503
HEF4052BT
7501
HEF4052BT
7504
HEF4052BT
VDD
MSB LSB
LOGIC
VSS VEE
I502/I504
I517/I518
F501/F502
A: DC, 500mV/Div
500us/Div
3502 1K
2531 100p not used
3501 1K
MC33078
7505-A
ALADC to DAC_ADC
7505-B
MC33078
2521 100n
3509 1K
2532 100p not used
3512 1K
2530 100n
ARADC to DAC_ADC
3506 100K
3505 100K
2509 100n
3532 1K
3535 3K9 not used
7502-A
MC33079
3508 1K
2514 100n
3533 1K
3536 3K9 not used
7502-B
MC33079
3513 1K
3534 100K
3507 100K
3510 100K
3511 100K
3516 100K
3514 100K
2518 100n
F504
2516 100u
2511 100u
ASC1S from IOV
ASC1M from IOV
2535 100n
2512 100n
AKILL from IOV
3517 4K7
-4.3V
7506
BC817-25W(COL)
3519 4K7
7508
BC817-25W(COL)
3515 1K
3538 3K9 not used
7502-D
MC33079
3518 1K
2522 100u
3522 220R
2523 1n
3524 820R
AOUT1R to IOV
3523 1K
3537 3K9 not used
7502-C
MC33079
3526 1K
2526 100u
3525 220R
2527 1n
3527 820R
AOUT1L to IOV
F501
F502
3530 820R
2520 1n
3531 820R
2517 1n
3520 220R
3521 220R
3528 4K7
7509
BC817-25W(COL)
3529 4K7
7511
BC817-25W(COL)
2524 1u
2525 1u
AFEL from MSP
AFER from MSP
AKILL IOV
AOUT2L to IOV
AKILL from IOV
AOUT2R to IOV
2513 1u0 X5R
ALDAC from DAC_ADC
2515 1u0 X5R
ARDAC from DAC_ADC
2536 100n
5NSTBY
0V
3
TR 17017_001
230204

2501	A5
2502	A6
2503	A2
2504	A1
2505	A1
2506	A4
2507	A6
2508	A6
2509	B4
2510	A3
2511	E4
2512	D7
2513	F4
2514	C4
2515	F5
2516	E3
2517	F4
2518	E2
2519	A4
2520	F3
2521	C9
2522	E8
2523	E9
2524	F1
2525	F1
2526	F8
2527	F9
2530	C9
2531	B8
2532	C8
2535	D5
2536	F5
3501	B8
3502	B8
3503	A5
3504	A5
3505	C6
3506	B5
3507	C1
3508	C3
3509	C8
3510	D1
3511	D1
3512	D8
3513	D3
3514	E1
3515	D7
3516	E1
3517	D8
3518	E7
3519	E8
3520	F3
3521	F4
3522	E9
3523	E7
3524	E9
3525	F9
3526	F7
3527	F9
3528	F2
3529	F3
3530	F2
3531	F4
3532	C3
3533	D3
3534	C1
3535	C3
3536	D3
3537	F7
3538	E7
7501	A7
7502-A	C4
7502-B	D4
7502-C	E7
7502-D	D7
7503	B2
7504	D5
7505-A	B9
7505-B	C8
7506	D9
7508	E9
7509	F2
7511	F4
F501	E2
F502	F2
F504	D2
I501	C1
I502	C1
I503	B1
I504	D1
I505	B2
I506	B2
I507	C3
I508	E4
I509	D3
I510	D3
I511	C3
I513	C6
I514	C6
I515	B6
I516	B6
I517	B8
I518	C8
I519	D6
I520	D7
I521	D6
I523	D9
I524	E9
I525	B8
I526	C8
I527	F1
I528	F1
I529	E6
I530	E7
I531	E3
I532	E4
I533	E3
I534	E8
I535	E8
I539	F8
I540	F8

Analog Board: Power Supply (PS)


1
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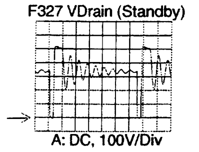
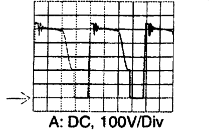
11
12
13
14
A
B
C
D
E
F
G
H
I
MAINS CONN
1931
9452A
1300
1301
T2.5A
F308 F309
F311
F310
F313 F314
2302 220n
2340 470p
3305 680K
GND
1302 DSP
1306
3306 220R
5302 HF2022R
1936 PSI-SUB-E
delete for HDD
for HDD only
2303 1n
6302 1N4006GP
6301 1N4006GP
6305 1N4006GP
6306 1N4006GP
2307 1n
GNDHOT
2309 68u
3308 330K
3309 330K
3310 330K
2308 47n
6309 BYT42M
2314 not used
3300 3M3
3301 3M3
2301 2n2
5300 SRW28EC9-E02V0133
not used
2316 47n
3319 4R7
2333 47n
6300 SB340
6303 SB340
5Vreg
5308 22u
2305 1m
2306 560u
3Vreg
6307 STPS5L40
6308 STPS5L40
5306 2u2
1304 T4A
2312 1m
2313 560u
6310 STPS3L60-C2
5309 22u
2319 1m
2320 330u
2335 10u
12VSTBY
7317 STD17NF03L
1307 T1A MRT
5VSTBY to IOV, IOA, DAC_ADC
3335 470R
3336 470R
7301 TL431
2310 1n
3339 4K7
3340 4K7
3341 68K
3374 470R
3375 470R
3376 470R
3377 470R
not used
7302 STP16NF06FP
3337 1K
3338 220R
2311 1n
7304 TL431
3342 4K7
3343 4K7
3344 47K
1309 T2A
5V to DAC_ADC, DIGIO
5301 1u0
for Card Reader only
5VCR
3V3 to DAC_ADC
7303 STS9NF30L
2330 1n
3312 220R
7305 TL431
3314 1K
3315 8K2
3316 4K7
1308 500mA PSC
12VSTBY to IOV
7318 SI2306DS
33VSTBY
3313 100K
3368 1K5
3378 1K5
3323 220K
7306 PDTC124EU
ION from IOV
5NSTBY to IOV, IOA, DAC_ADC
5N to MSP, DAC_ADC
6313 SBYV27-200
1303 T1A MRT
5307 22u
9301 not used
6325 1N5819
2344 220u 6.3V for HDD only
2322 1m delete for HDD
2323 100u
3325 47K
7309 SI2312DS
3361 1K
6322 BZX384-C6V8
7312 BF422
3302 1K
3303 1K
33VSTBY to FV
3322 47R not used
9304
6317 BYD33D
3304 10K
3307 10K
6318 BZX79-B33
6315 BAS316
6312 BZX384-C6V8
3346 2K2
3383 2K2
1306 125mA MP13
VGNSTBY to IOV
7313 TEA1507
DRAIN HVS DRIVER SENSE VCC GND CTRL DEMAG
7307 STP3NC60FP
340V
1.9V
0V
2315 47p
3318 100R
2317 1n
3321 0R47
3352 0R68
6311 1N4003
3365 3K3
2342 1u
3356 820R
3360 820R
3366 1K5
3367 1K8
3351 1M0
6321 BAT254
2318 2n2
3324 560K
6316 BAV21
2337 10p not used
3317 1K
7314 TCET1108G
2324 100n
2325 22u
3347 4K7
2331 100n
3330 470R
2329 100n
3331 10R
3332 5K6
7315 TL431
3333 4K7
3334 56K
3345 15K not used
GNDreg
3357 4K7
7310 BC847BW
7311 BC847BW
3359 4K7 not used
3384 10K
3328 10K
3358 10R
2336 100n
5305 Bead
6319 BYD33D
2304 2n2
2328 22u
7321 PDTC124EU
3355 47R
7319 BC846B
3348 680R
3382 680R
6314 BZX384-C8V2
6320 BAS316
3349 47R
3371 47R
3372 33R
3373 33R
3326 47R
9305 not used
7322 BC857BW
3353 2K7
3354 2K7
6324 BZX384-C27
2338 100n
7308 PDTC124EU
3327 1M
7320 SI2306DS
2332 1u0
3329 2M2
IPFAIL to DAC_ADC, IOV
STBY from IOV
8SW to MSP
STBY from IOV
5SW to IOV, FOHE, FV, VPS, DIGIO, MSP
TO DIGITAL BOARD
1932
PH-B
1934
EH-B
TO PCMCIA
for Card Reader or HDD only
1935
B2B-PH-K
4304 for HDD only
TO BASIC ENGINE
not used
1933
9302
4
TR 17018_001
260204

F327 VDrain (Standby)



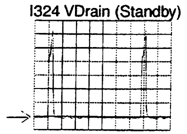
A: DC, 100V/Div
5us/Div

F327 VDrain (no disc loaded)



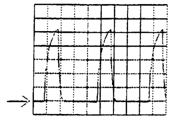
A: DC, 100V/Div
2us/Div

I324 VDrain (Standby)



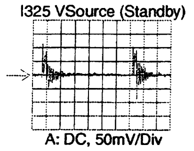
A: DC, 1V/Div
5us/Div

I324 VGate (no disc loaded)



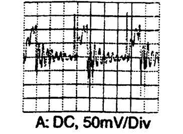
A: DC, 2V/Div
2us/Div

I325 VSource (Standby)



A: DC, 50mV/Div
5us/Div

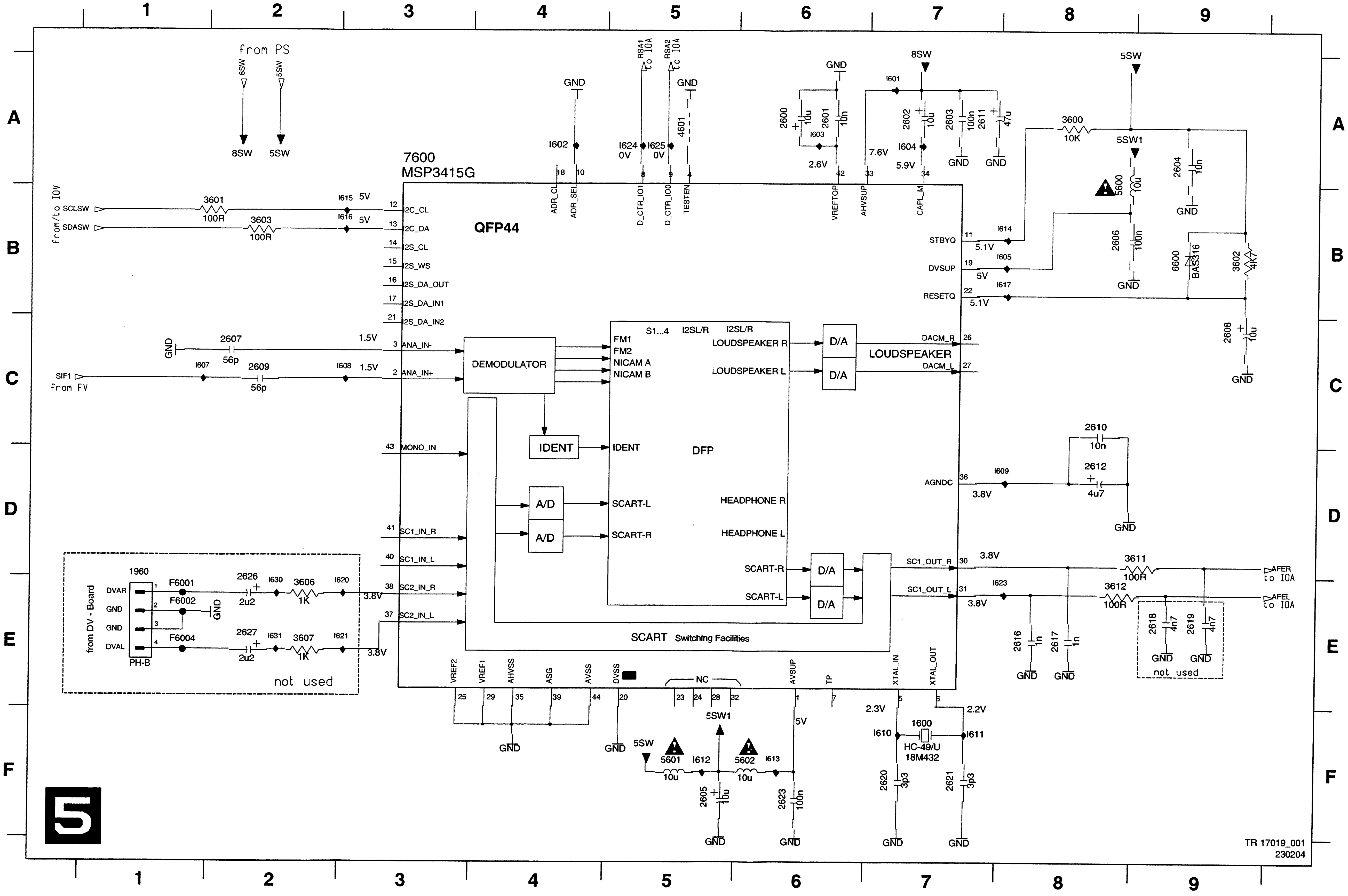
I325 VSource (no disc loaded)



A: DC, 50mV/Div
2us/Div

1300	A2
1301	B2
1302	A3
1303	E9
1304	C9
1306	G13
1307	A12
1308	D13
1309	A13
1931	B1
1932	C1
1933	G1
1934	E1
1935	F1
1936	B3
2301	A7
2302	B2
2303	B4
2304	G9
2305	B8
2306	B9
2307	C5
2308	C6
2309	D4
2310	A11
2311	B11
2312	C8
2313	C9
2314	D6
2315	E4
2316	A8
2317	E4
2318	G6
2319	D9
2320	D9
2321	E11
2322	F9
2323	F10
2324	H4
2325	H5
2326	G11
2327	G12
2328	G10
2329	I6
2330	C11
2331	I4
2332	H14
2333	A8
2334	I10
2335	D10
2336	I8
2337	H3
2338	H12
2339	B10
2340	A3
2341	B10
2342	F4
2343	E11
2344	F9
3300	A6
3301	A6
3302	F11
3303	F11
3304	F11
3305	B3
3306	A4
3307	F11
3308	C5
3309	C5
3310	C5
3311	C10
3312	C10
3313	D12
3314	C12
3315	C12
3316	C12
3317	H6
3318	E3
3319	A7
3321	E4
3322	F10
3323	E12
3324	G4
3325	E11
3326	G12
3327	H13
3328	H8
3329	I13
3330	I6
3331	I7
3332	I7
3333	I7
3334	I7
3335	A10
3336	A10
3337	B10
3338	B10
3339	A12
3340	A12
3341	A12
3342	B12
3343	B12
3344	B12
3345	I7
3346	F8
3347	I3
3348	H10
3349	G11
3350	F11
3351	G4
3352	E5
3353	H11
3354	H12
3355	I10
3356	G5
3357	H7
3358	H8
3359	H9
3360	G5
3361	F12
3362	H10
3363	G8
3364	G8
3365	F4
3366	G5
3367	G5
3368	D11
3371	H11
3372	H11
3373	H11
3374	A13
3375	A13
3376	A13
3377	A13
3378	D11
4301	G12
4304	F2
5300	A6
5301	B13
5302	B4
5304	D6
5305	G9
5306	C8
5307	E10
5308	A9
5309	D9
6300	A8
6301	B4
6302	B5
6303	B8
6305	C4
6306	C5
6307	C8
6308	C8
6309	D5
6310	D8
6311	E5
6312	F8
6313	E8
6314	I10
6315	F8
6316	H5
6317	F10
6318	G12
6319	G9
6320	I10
6321	G4
6322	F12
6324	H12
6325	E10
7301	A11
7302	B10
7303	C11
7304	B11
7305	C11
7306	D12
7307	E4
7308	H13
7309	E11
7310	H8
7311	H8
7312	F12
7313	G3
7314	H5
7315	I6
7317	A11
7318	D10
7319	I11
7320	H14
7321	I10
7322	G12
9301	E10
9302	G2
9304	F10
9305	H12
C300	B8
F300	A12
F301	A13
F302	A13
F304	A8
F305	A7
F306	B6
F307	A6
F308	B1
F309	B2
F310	B3
F311	B2
F312	B7
F313	C1
F314	C2
F315	C7
F316	C9
F317	C9
F318	C9
F319	C8
F320	C7
F321	D12
F322	D13
F323	D7
F324	D13
F325	D13
F326	D8
F328	E3
F329	E8
F331	F13
F333	F13
F334	F10
F335	F10
F336	G9
F337	G9
F338	G6
F339	G9
F340	G12
F341	G13
F342	G3
F343	G12
F344	G14
F346	E13
F347	E13
F348	G2
F349	A13
F350	G1
F351	A14
F352	G2
F353	G1
F354	E12
F355	E12
F356	C9
F357	H2
F358	G2
F359	I9
F360	H1
F361	I6
F362	G11
F363	G11
F364	A12
F366	E8
F367	E8
F368	E9
F369	E9
F371	G13
F372	G13
F373	A12
F374	A13
F381	D1
F382	E14
F383	D1
F384	D1
I300	A6
I301	A12
I302	A7
I303	A8
I304	A10
I305	A11
I306	A3
I307	G4
I308	B8
I309	B12
I310	B8
I311	B9
I312	B5
I313	B10
I314	B4
I315	B11
I316	B5
I317	C4
I318	C12
I319	C10
I320	C11
I321	D6
I322	D6
I323	D12
I324	E3
I325	E5
I326	E10
I327	F11
I329	F11
I330	F3
I331	F4
I332	F8
I333	F11
I334	F12
I335	F6
I336	F8
I337	F10
I338	F11
I339	G8
I340	G5
I342	I12
I343	H6
I344	H6
I345	H8
I346	H13
I347	H11
I348	I3
I349	H10
I350	I6
I351	I7
I352	I11
I353	I14
I354	I13
I355	I7
I356	H12
I357	H11
I361	I8

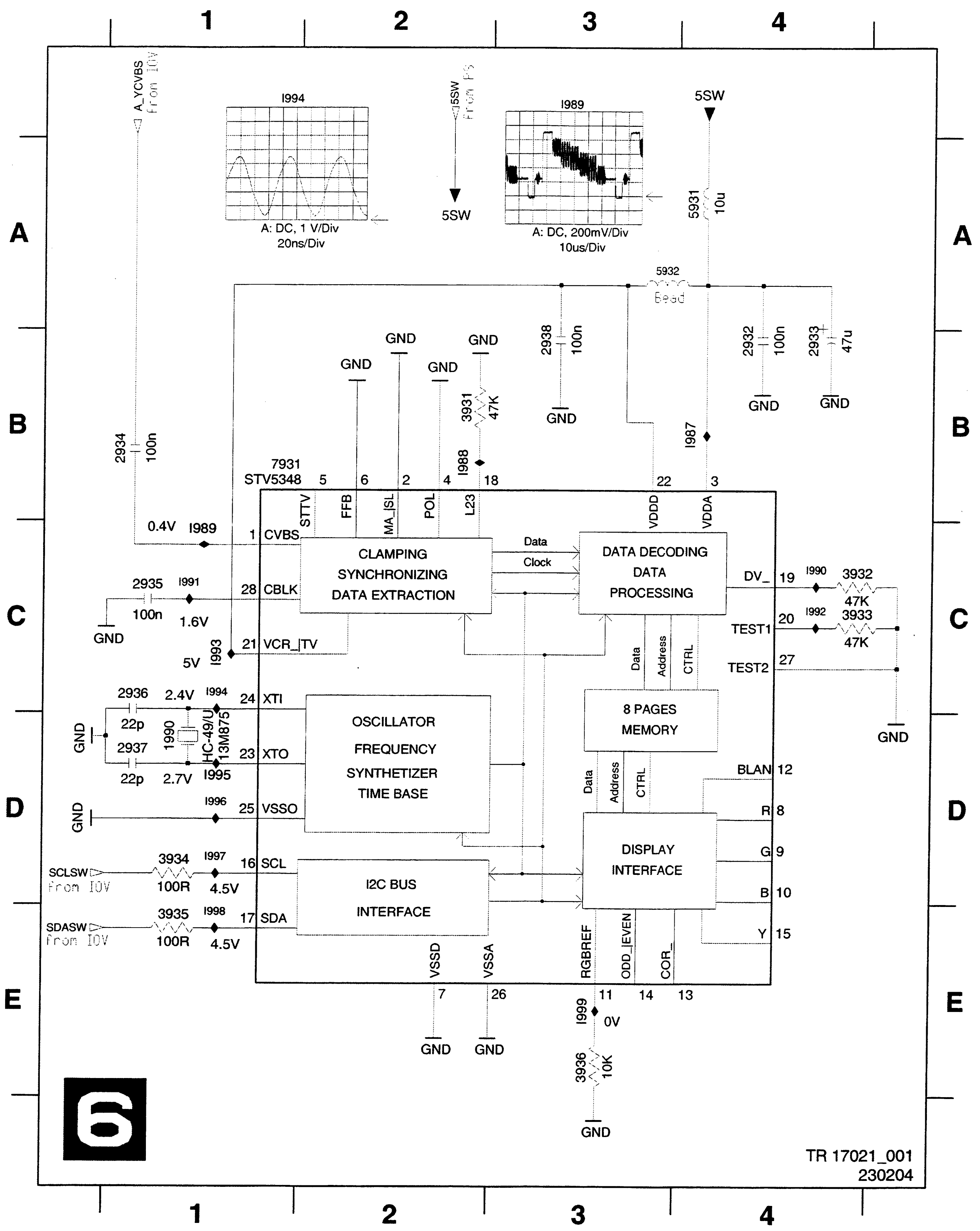
Analog Board: Multi Sound Processing (MSP)


from PS
8SW
5SW
7600
MSP3415G
QFP44
from/to IOV
SCLSW
SDASW
3601
100R
3603
100R
I615 5V
I616 5V
I2C_CL
I2C_DA
I2S_CL
I2S_WS
I2S_DA_OUT
I2S_DA_IN1
I2S_DA_IN2
GND
2607
56p
1.5V
ANA_IN-
SIF1
from FV
I607
2609
56p
I608
1.5V
ANA_IN+
DEMODULATOR
IDENT
MONO_IN
A/D
A/D
FM1
FM2
NICAM A
NICAM B
S1...4
I2SL/R
LOUDSPEAKER R
LOUDSPEAKER L
D/A
D/A
LOUDSPEAKER
DACM_R
DACM_L
DFP
SCART-L
SCART-R
HEADPHONE R
HEADPHONE L
SC1_IN_R
SC1_IN_L
SC2_IN_R
SC2_IN_L
SCART Switching Facilities
SC1_OUT_R
SC1_OUT_L
3.8V
3611
100R
3612
100R
AFER to IOA
AFEL to IOA
2616 1n
2617 1n
2618 4n7
2619 4n7
not used
I623
1960
F6001
F6002
F6004
DVAR
GND
GND
DVAL
PH-B
from DV - Board
2626 2u2
2627 2u2
I630
I631
3606 1K
3607 1K
I620
I621
not used
GND
I602
RSA1 to IOA
RSA2 to IOA
I624 0V
I625 0V
4601
ADR_CL
ADR_SEL
D_CTR_IO1
D_CTR_IO0
TESTEN
GND
2600 10u
2601 10n
I603
2.6V
VREFTOP
AHVSUP
CAPL_M
7.6V
I601
2602 10u
2603 100n
2611 47u
I604
5.9V
3600
10K
5SW1
5600 10u
2604 10n
2606 100n
6600 BAS316
3602 4K7
STBYQ
DVSUP
RESETQ
I614
I605
I617
5.1V
5V
5.1V
2608 10u
2610 10n
2612 4u7
AGNDC
I609
3.8V
VREF2
VREF1
AHVSS
ASG
AVSS
DVSS
NC
AVSUP
TP
XTAL_IN
XTAL_OUT
5SW1
5SW
5601 10u
I612
5602 10u
I613
2605 10u
2623 100n
5V
2.3V
2.2V
I610
I611
1600
HC-49/U
18M432
2620 3p3
2621 3p3
TR 17019_001
230204
5
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

1600	F7
1960	E1
2600	A6
2601	A6
2602	A7
2603	A7
2604	A9
2605	F5
2606	B8
2607	C2
2608	C9
2609	C2
2610	C8
2611	A7
2612	D8
2616	E8
2617	E8
2618	E9
2619	E9
2620	F7
2621	F7
2623	F6
2626	E2
2627	E2
3600	A8
3601	B2
3602	B9
3603	B2
3606	E2
3607	E2
3611	D9
3612	E8
4601	A5
5600	A8
5601	F5
5602	F6
6600	B9
7600	A3
F6001	E1
F6002	E1
F6004	E1
I601	A7
I602	A4
I603	A6
I604	A7
I605	B8
I607	C1
I608	C3
I609	D8
I610	F7
I611	F7
I612	F5
I613	F6
I614	B8
I615	B3
I616	B3
I617	B8
I620	E3
I621	E3
I623	E8
I624	A5
I625	A5
I630	E2
I631	E2

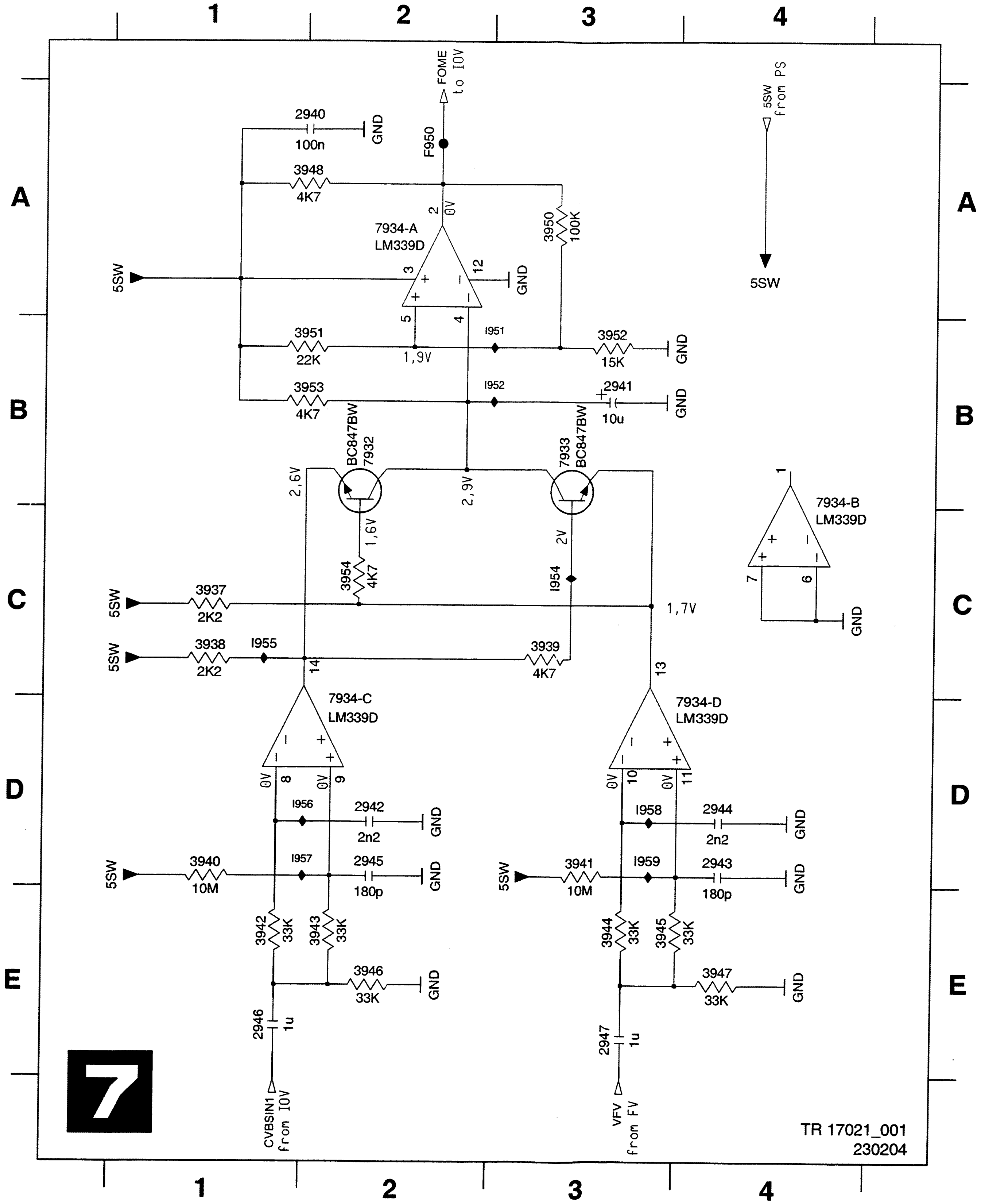
Analog Board: VPS

1990	D1
2932	B4
2933	B4
2934	B1
2935	C1
2936	C1
2937	D1
2938	B3
3931	B2
3932	C4
3933	C4
3934	D1
3935	E1
3936	E3
5931	A4
5932	A3
7931	B2
1987	B4
1988	B2
1989	C1
1990	C4
1991	C1
1992	C4
1993	C1
1994	C1
1995	D1
1996	D1
1997	D1
1998	E1
1999	E3


1
2
3
4
A
B
C
D
E
A_YCVBS from IOV
I994
A: DC, 1 V/Div
20ns/Div
5SW from PS
5SW
I989
A: DC, 200mV/Div
10us/Div
5SW
5931 10u
5932 Bead
GND
2938 100n
2932 100n
2933 47u
3931 47K
I988
I987
2934 100n
7931
STV5348
STTV
FFB
MA_ISL
POL
L23
VDDD
VDDA
0.4V
CVBS
CLAMPING
SYNCHRONIZING
DATA EXTRACTION
Data
Clock
DATA DECODING
DATA
PROCESSING
DV_
TEST1
TEST2
3932 47K
3933 47K
2935 100n
1.6V
CBLK
VCR_|TV
5V
I993
2936 22p
2937 22p
2.4V
2.7V
1990 HC-49/U 13M875
I995
XTI
XTO
VSSO
OSCILLATOR
FREQUENCY
SYNTHETIZER
TIME BASE
8 PAGES
MEMORY
Address
CTRL
BLAN
R
G
B
Y
DISPLAY
INTERFACE
SCLSW from IOV
3934 100R
4.5V
SCL
I2C BUS
INTERFACE
SDASW from IOV
3935 100R
4.5V
SDA
VSSD
VSSA
RGBREF
ODD_|EVEN
COR_
I999
0V
3936 10K
6
TR 17021_001
230204

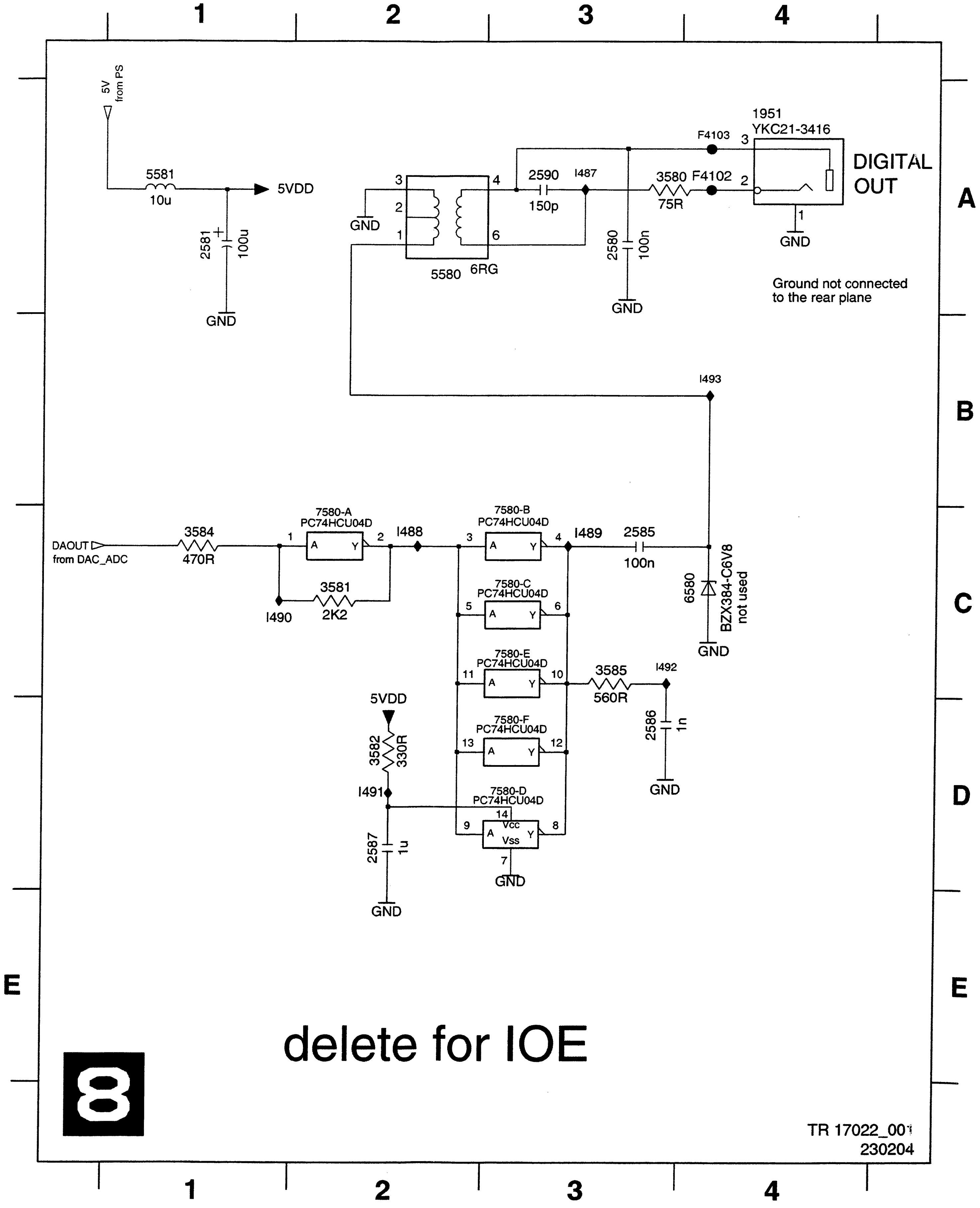
Analog Board: Follow Me (FOME)

2940	A2
2941	B3
2942	D2
2943	D4
2944	D4
2945	D2
2946	E1
2947	E3
3937	C1
3938	C1
3939	C3
3940	D1
3941	D3
3942	E1
3943	E2
3944	E3
3945	E3
3946	E2
3947	E4
3948	A2
3950	A3
3951	B2
3952	B3
3953	B2
3954	C2
7932	B2
7933	B3
7934-A	A2
7934-B	B4
7934-C	C2
7934-D	C3
F950	A2
I951	B3
I952	B3
I954	C3
I955	C1
I956	D2
I957	D2
I958	D3
I959	D3


1
2
3
4
A
B
C
D
E
FOME to IOV
F950
2940 100n
GND
3948 4K7
0V
7934-A
LM339D
3950 100K
5SW
5SW from PS
5SW
3951 22K
1,9V
I951
3952 15K
3953 4K7
I952
2941 10u
BC847BW 7932
BC847BW 7933
2,6V
2,9V
1,6V
2V
3954 4K7
I954
7934-B
LM339D
3937 2K2
1,7V
3938 2K2
I955
3939 4K7
7934-C
LM339D
7934-D
LM339D
I956
2942 2n2
3940 10M
I957
2945 180p
I958
2944 2n2
3941 10M
I959
2943 180p
3942 33K
3943 33K
3946 33K
3944 33K
3945 33K
3947 33K
2946 1u
2947 1u
CVBSIN1 from IOV
VFV from FV
7
TR 17021_001
230204

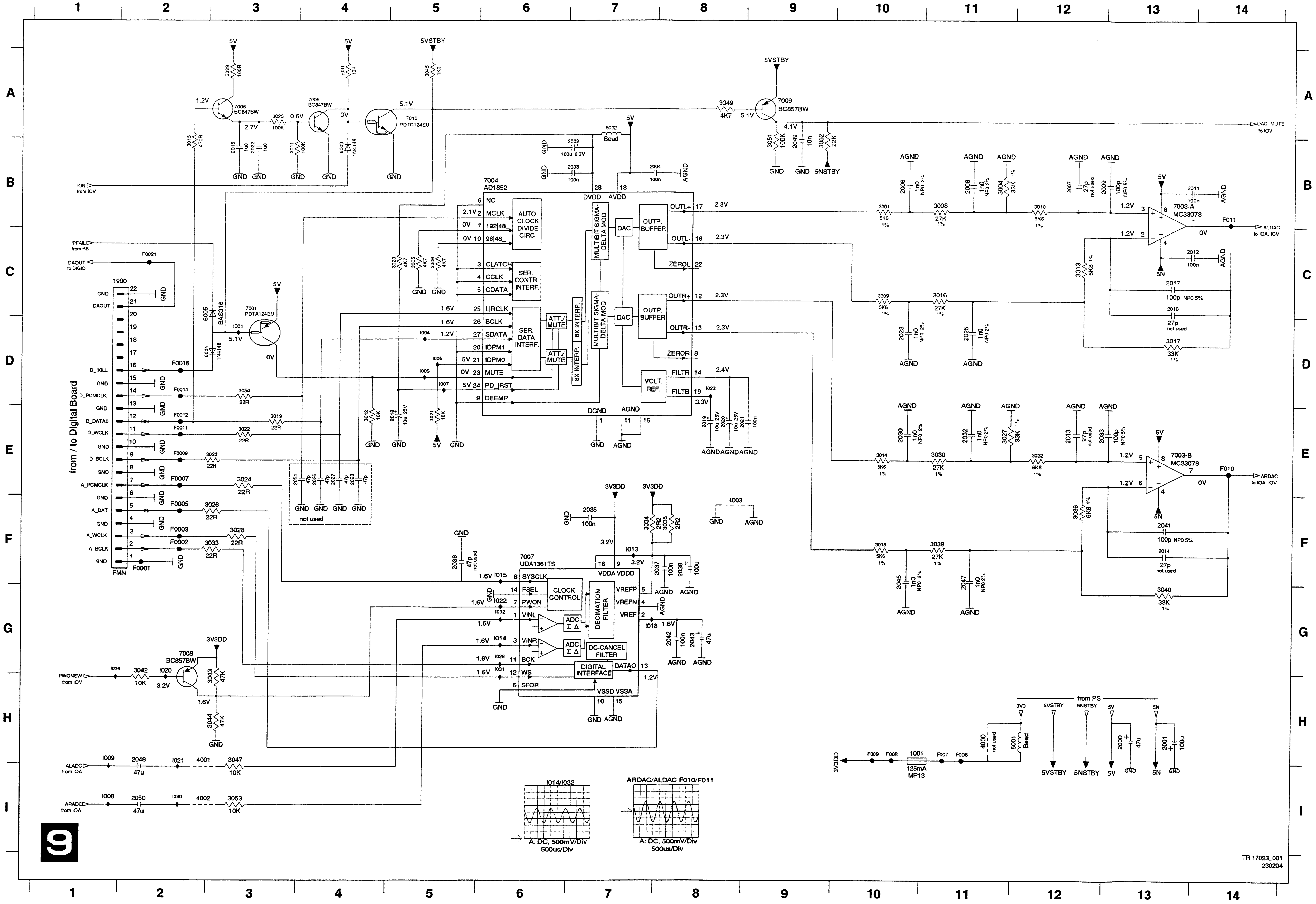
Analog Board: Digital In / Out (DIGIO)

Part	Location
1951	A4
2580	A3
2581	A1
2585	C3
2586	D3
2587	D2
2590	A3
3580	A3
3581	C2
3582	D2
3584	C1
3585	C3
5580	A2
5581	A1
6580	C4
7580-A	C2
7580-B	C3
7580-C	C3
7580-D	D3
7580-E	C3
7580-F	D3
F4102	A4
F4103	A4
I487	A3
I488	C2
I489	C3
I490	C1
I491	D2
I492	C3
I493	B4


1
2
3
4
A
B
C
D
E
5V from PS
5581
10u
5VDD
2581
100u
GND
5580
6RG
3
2
1
4
6
2590
150p
I487
3580
75R
F4102
F4103
1951
YKC21-3416
DIGITAL OUT
2580
100n
Ground not connected to the rear plane
I493
DAOUT from DAC_ADC
3584
470R
7580-A PC74HCU04D
I488
3581
2K2
I490
7580-B PC74HCU04D
I489
2585
100n
6580
BZX384-C6V8 not used
7580-C PC74HCU04D
7580-E PC74HCU04D
3585
560R
I492
2586
1n
7580-F PC74HCU04D
3582
330R
I491
7580-D PC74HCU04D
Vcc
Vss
2587
1u
8
TR 17022_001
230204

delete for IOE

Analog Board: Audio Converter (DAC_ADC)


7004 AD1852
AUTO CLOCK DIVIDE CIRC
SER. CONTR. INTERF.
SER. DATA INTERF.
ATT./ MUTE
8X INTERP.
MULTIBIT SIGMA-DELTA MOD
DAC
OUTP. BUFFER
VOLT. REF.
7007 UDA1361TS
CLOCK CONTROL
DECIMATION FILTER
ADC Σ Δ
DC-CANCEL FILTER
DIGITAL INTERFACE
7003-A MC33078
7003-B MC33078
7001 PDTA124EU
7005 BC847BW
7006 BC847BW
7008 BC857BW
7009 BC857BW
7010 PDTC124EU
1900
from / to Digital Board
ION from IOV
IPFAIL from PS
DAOUT to DIGIO
PWONSW from IOV
ALADC from IOA
ARADC from IOA
DAC_MUTE to IOV
ALDAC to IOA, IOV
ARDAC to IOA, IOV
from PS
1001 125mA MP13
I014/I032
A: DC, 500mV/Div 500us/Div
ARDAC/ALDAC F010/F011
A: DC, 500mV/Div 500us/Div
9
TR 17023_001 230204

1001	H10
1900	C2
2000	H13
2001	H13
2002	B7
2003	B7
2004	B7
2006	B10
2007	B12
2008	B11
2009	B12
2010	C13
2011	B13
2012	C13
2013	E12
2014	F13
2015	B3
2017	C13
2018	E5
2019	E8
2020	E8
2021	E8
2022	B3
2023	D10
2025	D11
2026	E4
2027	E4
2028	E4
2030	E10
2032	E11
2033	E12
2035	F7
2036	F5
2037	F7
2038	F8
2041	F13
2042	G8
2043	G8
2045	F10
2047	F11
2048	H2
2049	B9
2050	I2
2051	E3
3001	B10
3004	B11
3005	C5
3006	C5
3008	B11
3009	C10
3010	B12
3011	B3
3012	E4
3013	C12
3014	E10
3015	B2
3016	C11
3017	D13
3018	F10
3019	E3
3020	C5
3021	E5
3022	E3
3023	E3
3024	E3
3025	A3
3026	F3
3027	E11
3028	F3
3029	A3
3030	E11
3031	A4
3032	E12
3033	F3
3034	F7
3035	F8
3036	F12
3039	F11
3040	G13
3042	G2
3043	H3
3044	H3
3045	A5
3047	H3
3049	A8
3051	B9
3052	B9
3053	I3
3054	D3
4000	H11
4001	H2
4002	I2
4003	F8
5001	H12
5002	A7
6003	B4
6004	D2
6005	C2
7001	C3
7003-A	B13
7003-B	E13
7004	B6
7005	A4
7006	A3
7007	F6
7008	G2
7009	A9
7010	A5
F0001	F2
F0002	F2
F0003	F2
F0005	F2
F0007	E2
F0009	E2
F0011	E2
F0012	E2
F0014	D2
F0016	D2
F0021	C2
F006	H11
F007	H11
F008	H10
F009	H10
F010	E14
F011	B14
I001	D3
I004	D5
I005	D5
I006	D5
I007	D5
I008	I1
I009	H1
I013	F7
I014	G6
I015	F6
I018	G7
I020	G2
I021	H2
I022	G6
I023	D8
I029	G6
I030	I2
I031	G6
I032	G6
I036	G1

Layout Analog Board (Top View)

0005 A8
0803 C5
1001 C2
1300 A9
1301 A9
1302 A10
1303 B9
1304 C8
1306B8
1307 A8
1308 C8
1309 A8
1600 B4
1701 B7
1702 B7
1703 B7
1704 C6
1705 A8
1706 C6
1900 C1
1931 A10
1932 C8
1933 C3
1934 C4
1935 C3
1936 A10
1940 A6
1942 C5
1943 A1
1945 C2
1947 B5
1948 A5
1949 A4
1951 A2
1960 C5
1990 A1
2000 B3
2001 B3
2002 B1
2018 B1
2019B1
2020 C1
2038 B2
2043 B1
2048 B2
2050 B2
2301 C10
2302 A10
2303 A10
2304 B9
2305 B9
2306 B8
2307 A10
2308 B10
2309 A10
2312 C9
2313 C8
2314 B10
2315 C10
2318 C10
2319 B9
2320 B8
2322 B9
2323 A8
2325 C10
2326 A9
2328 A9
2332 A8
2335 C8
2340 A9
2344 B9
2403 C6
2405 B6
2413 B6
2417 B6
2421 B6
2424 A4
2428 C5
2429 A5
2432 A5
2434 B6
2442 A5
2443 B5
2460 B5
2461 B5
2462 A4
2463 A4
2464 A7
2510 A2
2511 A4
2516 A3
2519 B3
2522 A4
2526 A3
2581 A1
2600 B5
2602 B5
2605 B4
2608 B4
2611 B5
2612 B5
2626 B5
2627 B5
2713 B7
2720 A8
2722 C7
2729 B7
2732 A8
2737 C6
2740 B7
2933 A1
2941 B2
3019 C1
3042 A2
3047 B2
3053 B2
3300 A10
3301 B10
3305 A10
3306 A10
3308 C10
3309 C10
3310 C10
3313 A8
3318 C10
3321 B10
3322 A9
3326 A9
3342 B8
3352 B10
3356 C10
3360 C10
3412 A7
3422 A5
3432 B6
3433 B6
3434 A5
3435 A5
3436 A5
3441 A5
3447 A7
3451 A2
3454 A7
3502 B3
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3515 A3
3517 A4
3519 A4
3523 A3
3532 A2
3533 A3
3601 B4
3603 B4
3701 B7
3703 B7
3724 A7
5300 B10
5301 C3
5302 A10
5304 B10
5305 A9
5306 C9
5307 B9
5308 B8
5309 B8
5401 C6
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5403 B6
5404 B4
5406 B5
5580 A2
5581 A1
5600 B4
5601 B4
5602 C4
5705 A8
5709 A7
5710 B7
5711 B7
5713 C7
5714 C6
5931 A1
6003 C3
6004 C1
6300 B9
6301 A10
6302 A10
6303 B9
6305 A10
6306 A10
6307 C9
6308 C9
6309 B10
6310 B9
6311 B10
6313 B9
6316 C10
6317 A8
6318 A9
6319 A9
6325 A9
7301 A8
7302 B8
7304 B8
7305 C8
7307 B10
7312 A8
7313 C10
7314 C10
7315 C9
7317 A8
9001 B9
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9003 C9
9004 C8
9005 B8
9006 B8
9008 A9
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9010 A8
9011 A7
9012 A8
9013 B8
9014 B8
9015 C7
9016 C6
9017 A7
9018 A6
9019 A6
9020 A6
9021 A5
9022 B6
9023 C5
9024 B5
9026 A2
9027 B3
9029 C3
9030 A2
9031 A1
9032 A1
9034 C2
9035 C1
9037 B4
9038 B2
9039 A3
9040 C3
9301 A9
9302 C7
9304 A9
9305 A9
9401 C3
9421 A5
9422 A8
9423 C6
9424 A7
9425 B10
9426 A7
9427 A6
9428 A7
9429 A5
9430 A7
9431 B6
9432 C4
9433 A5
9434 A5
9435 C4
9436 B5
9437 B5
9438 B5
9439 B4
9440 B8
9441 A6
9442 A4
9443 B3
9444 B3
9445 C3
9446 C6
9447 A2
9448 A1
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9480 A3
9481 A2
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9484 A1
9485 B6
9486 A4
9487 C3
9488 A2
9489 C3
9490 A4
9491 A2
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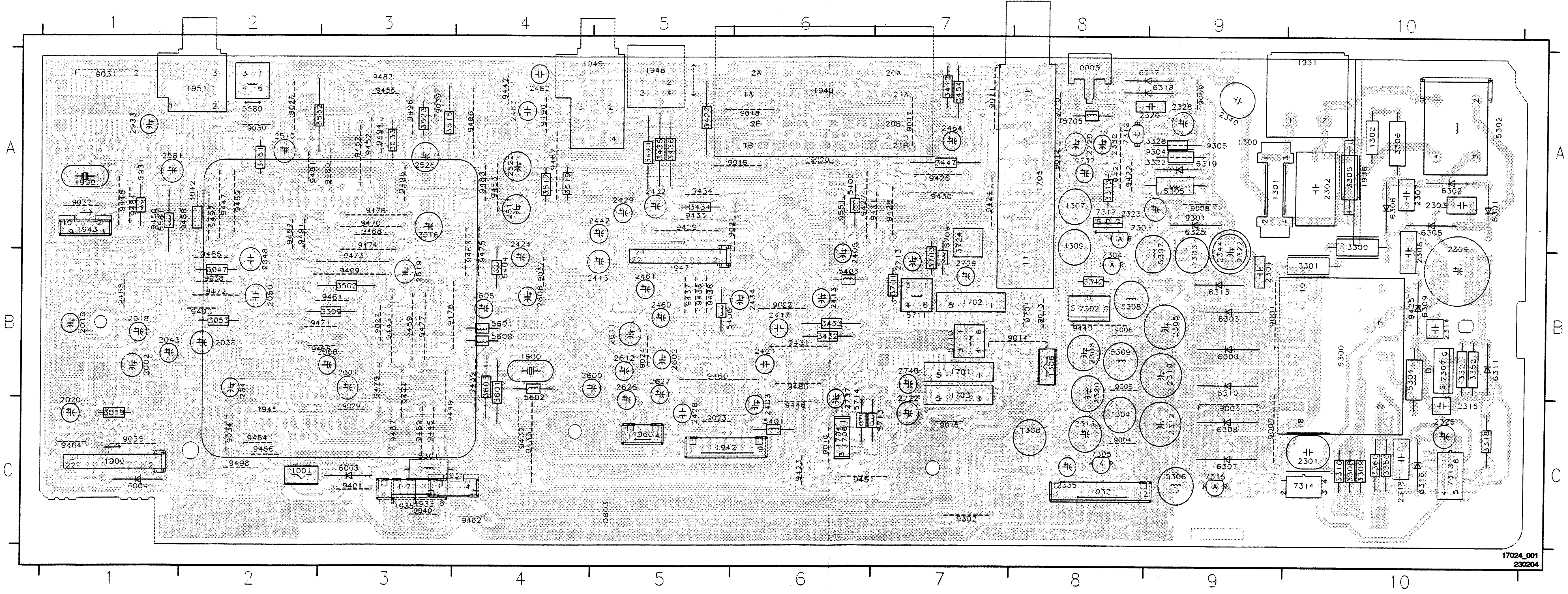
9701 B8



Layout Analog Board (Overview Bottom View)

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2004 B10	2025 B10	2051 C10	2338 A2	2414 B5	2438 B6	2504 A6	2524 B8	2604 B7	2724 B5
2006 B10	2026 C10	2310 B3	2339 B3	2415 A4	2439 B6	2505 A6	2525 B7	2606 B7	2725 B3
2007 B10	2027 C10	2311 B3	2341 B3	2416 A5	2440 B6	2506 A6	2527 A6	2607 B7	2727 B4
2008 B10	2028 C10	2316 B2	2342 C1	2418 A5	2441 B6	2507 C6	2530 B9	2609 C7	2728 B4
2009 B10	2030 B10	2317 B1	2343 B3	2419 B5	2444 A6	2508 C6	2531 B9	2610 B6	2730 B4
2010 B10	2032 B10	2321 B2	2401 A4	2420 A6	2445 A7	2509 A8	2532 B9	2616 B6	2731 B4
2011 B10	2033 B10	2324 C1	2402 A4	2422 A5	2446 C5	2512 B8	2535 A8	2617 B6	2733 A3
2012 B10	2035 C9	2327 A3	2404 C6	2423 A6	2447 A7	2513 A7	2536 A7	2618 B6	2734 B3
2013 B10	2036 B9	2329 C2	2406 A9	2425 A7	2448 A7	2514 A8	2580 A9	2619 B7	2735 A3
2014 B10	2037 B9	2330 C3	2407 A9	2427 A6	2449 C6	2515 A8	2585 A9	2620 B7	2736 A3
2015 C9	2041 B10	2331 C1	2408 B5	2430 A5	2450 A4	2517 A6	2586 A9	2621 B7	2741 B4
2017 B10	2042 B10	2333 B2	2409 A5	2433 B5	2459 B6	2518 A8	2587 A10	2623 B7	2742 B4
2021 C10	2045 B10	2334 B8	2410 A6	2435 B6	2501 A5	2520 A6	2590 A9	2719 B4	2932 A1
2022 C9	2047 B10	2336 A2	2411 B5	2436 B6	2502 B8	2521 B9	2601 B6	2721 B4	2934 A1

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2938 A10	3011 C9	3027 B10	3049 A9	3323 A3	3339 A3	3357 A2	3375 C4	3411 A4	3428 B6
2940 B9	3012 C9	3028 C10	3051 A9	3324 C10	3340 B3	3358 A2	3376 C3	3413 A4	3429 C6
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2943 B9	3014 B10	3030 B10	3054 C10	3327 A3	3343 B3	3361 B3	3378 A3	3415 A9	3437 B5
2944 B9	3015 C10	3031 C8	3302 A2	3328 A2	3344 B3	3362 B8	3400 A9	3416 A9	3438 B5
2945 B9	3016 B10	3032 B10	3303 A2	3329 A3	3345 C2	3363 A2	3401 A5	3417 A5	3439 B5
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3001 B10	3020 B10	3035 B9	3311 C3	3332 C2	3348 A8	3366 C1	3404 A4	3420 A5	3443 A7
3004 B10	3021 B10	3036 B10	3312 C3	3333 C2	3349 A8	3367 C1	3405 A4	3421 A6	3444 A7
3005 C10	3022 C10	3039 B10	3314 C3	3334 C2	3350 A3	3368 C3	3406 A4	3423 A6	3445 B5
3006 C10	3023 C10	3040 B10	3315 C3	3335 C3	3351 C1	3371 A8	3407 A4	3424 B6	3446 A4

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3449 A5	3467 A5	3486 A7	3506 C6	3526 A8	3585 A9	3717 C5	3740 C4	3938 B8	3954 B9
3450 A7	3468 A5	3487 A6	3507 A8	3527 A7	3600 B7	3720 C4	3741 C5	3939 B9	3955 A8
3452 A5	3469 A5	3488 A6	3508 A7	3528 A6	3602 B7	3725 B5	3742 B4	3940 B9	4000 C8
3455 B5	3470 A5	3489 C6	3510 B8	3529 A7	3606 C6	3726 B4	3743 C5	3941 B9	4001 B9
3456 A7	3471 A5	3490 A6	3511 A7	3530 A7	3607 B6	3728 C4	3744 C4	3942 B9	4002 B9
3457 A7	3472 A5	3491 A6	3512 B9	3531 A7	3611 B7	3730 B3	3745 A4	3943 B9	4003 A1
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3461 A5	3478 A6	3495 A7	3518 A7	3537 A8	3705 C4	3734 C5	3932 A1	3947 B9	4402 A9
3462 A5	3481 B5	3496 A7	3520 A7	3538 A7	3710 B4	3735 C5	3933 A1	3948 C9	4411 B5
3463 A5	3482 C6	3501 B9	3521 A7	3580 A9	3711 A3	3736 C5	3934 A1	3950 C9	4412 B6
3464 A5	3483 B5	3503 A7	3522 A7	3581 A9	3714 B5	3737 B4	3935 A1	3951 C9	4413 B6
3465 A5	3484 B5	3504 A7	3524 A7	3582 A10	3715 B5	3738 B4	3936 A10	3952 C9	4414 B6

4415 A6	4431 A8	4455 B10	5932 A1	6415 A5	6600 B7	7308 A3	7407 B6	7505 B9	7713 C5
4416 C9	4433 B6	4459 B10	6005 C9	6416 A5	6703 B3	7309 B2	7408 B5	7506 A7	7714 B4
4417 B6	4434 B6	4460 B10	6312 A2	6417 A5	6704 B3	7310 A2	7409 B6	7508 A7	7716 C5
4418 B5	4435 A8	4461 B3	6314 B8	6418 A5	6705 B4	7311 A2	7410 A7	7509 A6	7717 C5
4419 A6	4437 B8	4601 B7	6315 B2	6419 A4	7001 C9	7318 C3	7411 B6	7511 A7	7931 A10
4420 C5	4442 B8	4700 B3	6320 B8	6420 A4	7003 B10	7319 B7	7412 A8	7580 A9	7932 B8
4421 B5	4443 A8	4701 B4	6321 C1	6422 A5	7004 B10	7320 A3	7415 A7	7600 B7	7933 B9
4422 A6	4444 A9	4999 C10	6322 B3	6423 A6	7005 C9	7321 B8	7416 A6	7701 B5	7934 B9
4423 A6	4446 A8	5001 C8	6324 A2	6424 A4	7006 C10	7322 A2	7419 A9	7702 B5	
4424 A5	4447 A4	5002 B10	6401 A4	6425 A6	7007 B10	7401 A4	7420 A9	7704 B4	
4425 A6	4448 A6	5405 A7	6402 A5	6426 A6	7008 B9	7402 A4	7421 A9	7705 B4	
4426 A6	4449 A6	5407 A7	6403 A5	6427 A6	7009 A9	7403 A4	7501 B8	7706 C5	
4428 A8	4452 A3	5701 A3	6404 A5	6428 A6	7010 C9	7404 A9	7502 A8	7710 B4	
4429 A5	4453 A8	5702 A3	6409 A5	6429 A6	7303 C3	7405 A6	7503 A8	7711 C5	
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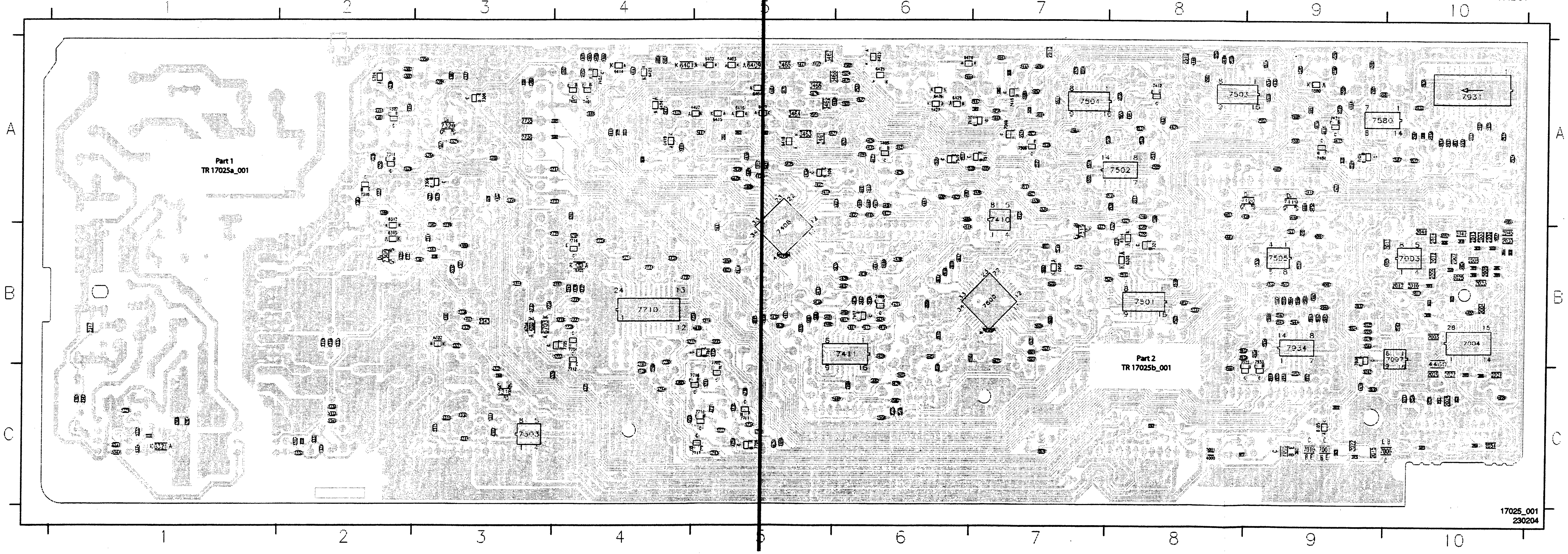
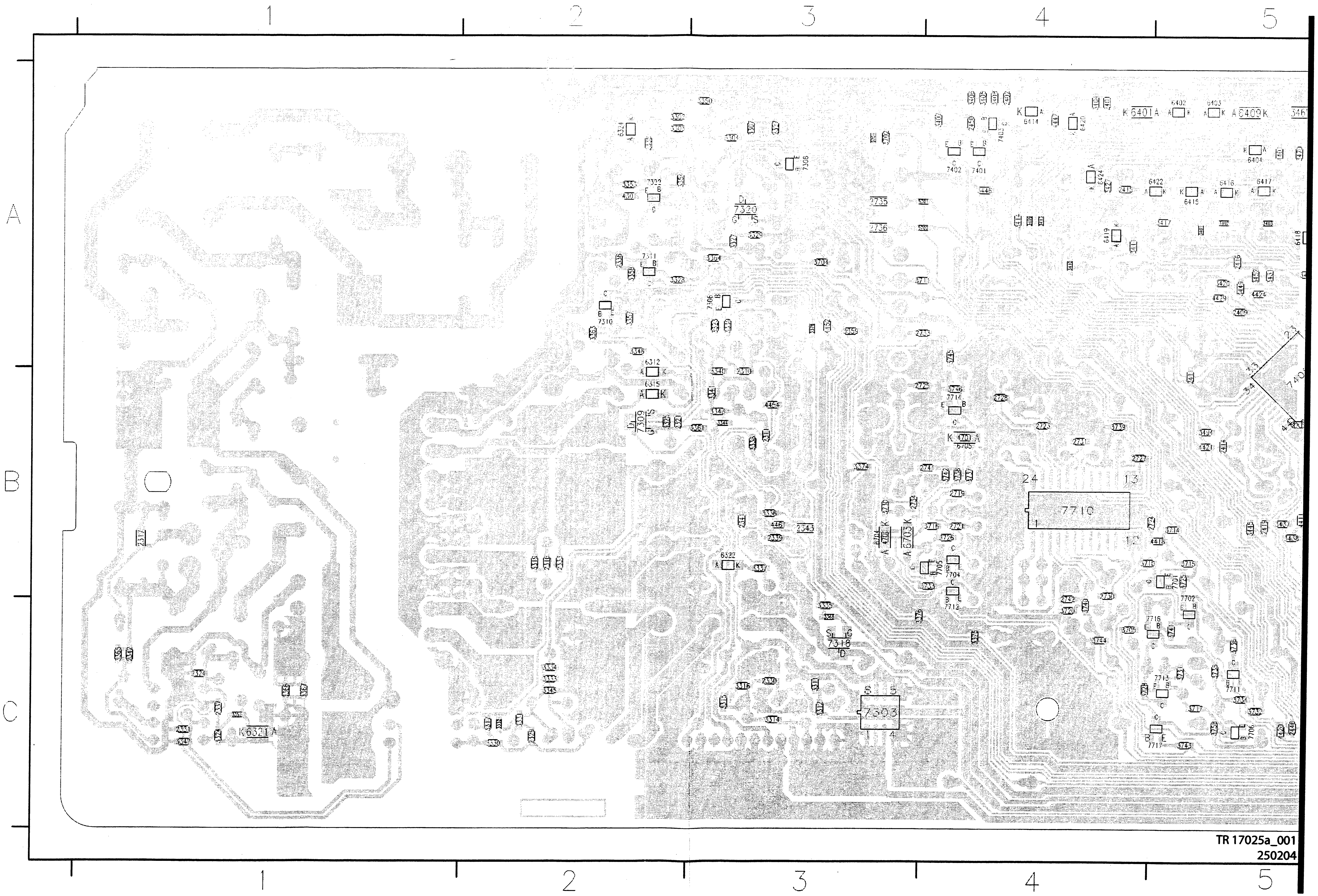


Layout Analog Board (Part 1 Bottom View)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A
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C
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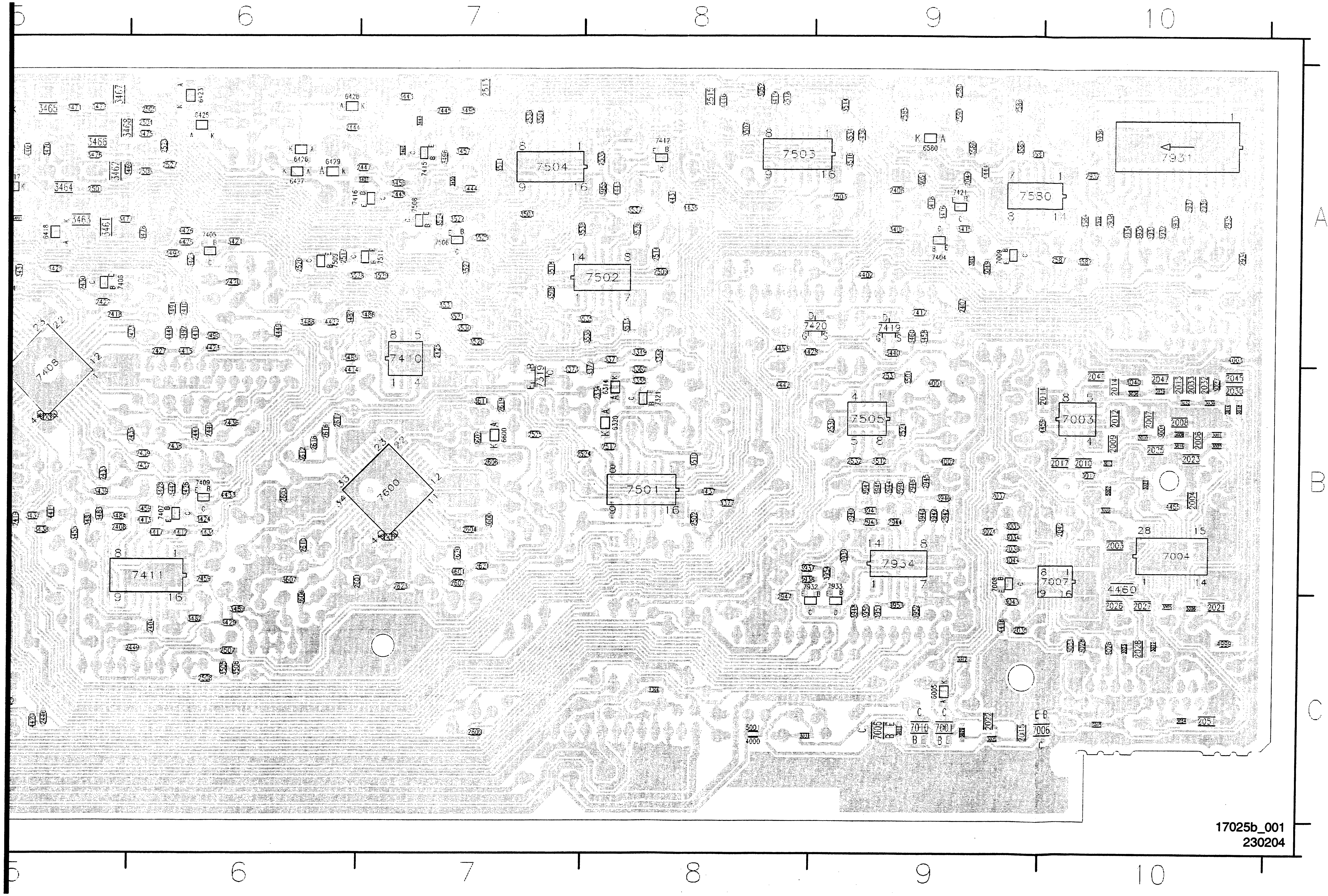
TR 17025a_001
250204

Layout Analog Board (Part 2 Bottom View)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10
A
B
C
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7503
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7502
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2023
2017
2019
2003
4460
2026
2027
2021
2051
7010
7001
7006
2022
2015
17025b_001
230204

Power Supply Interface (PSI)

0005 C3	1350 B2	1937 C1	1939 B4	3381 B2	F390 B1	F392 C1	F394 B3
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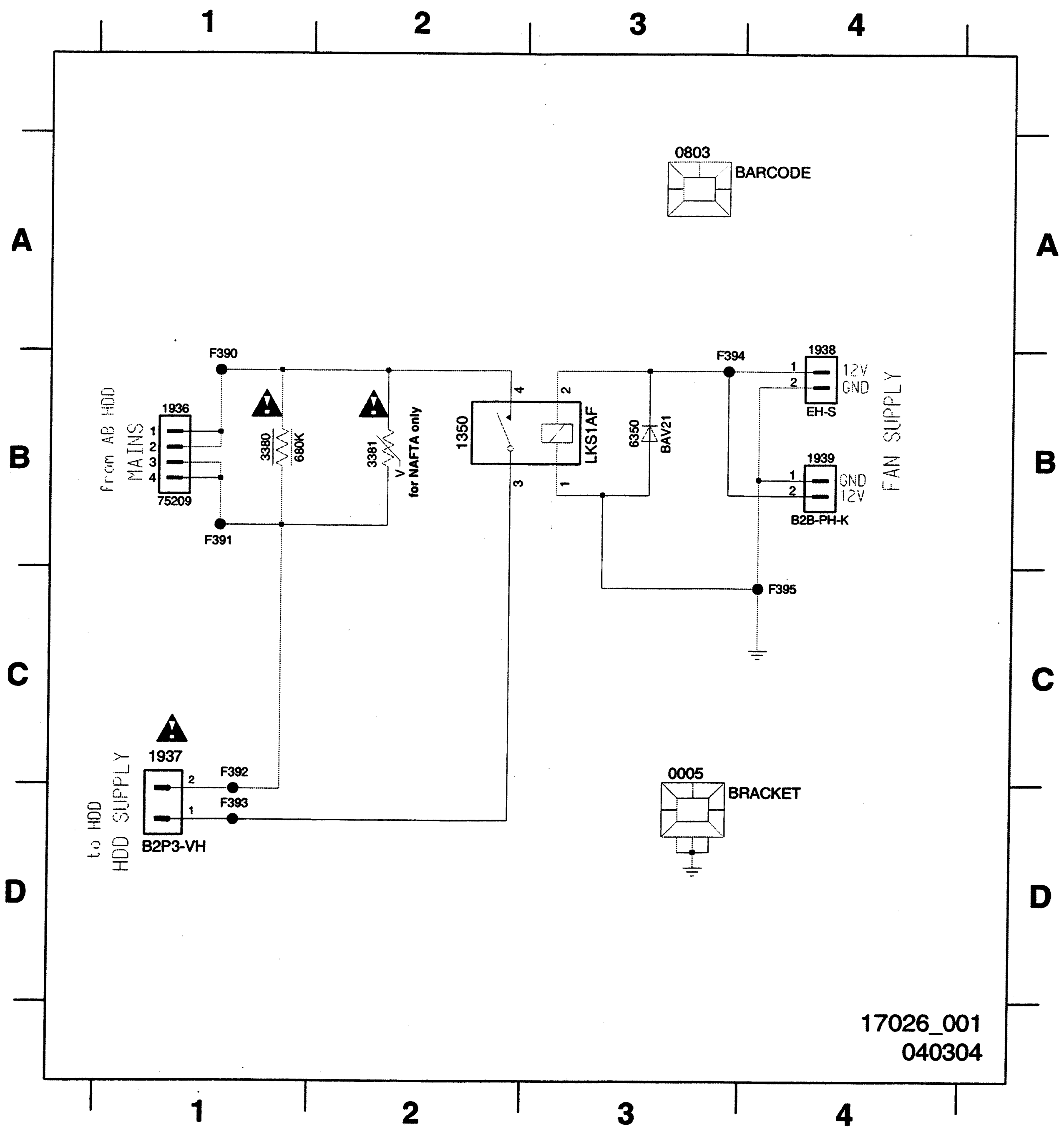
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C
D
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BARCODE
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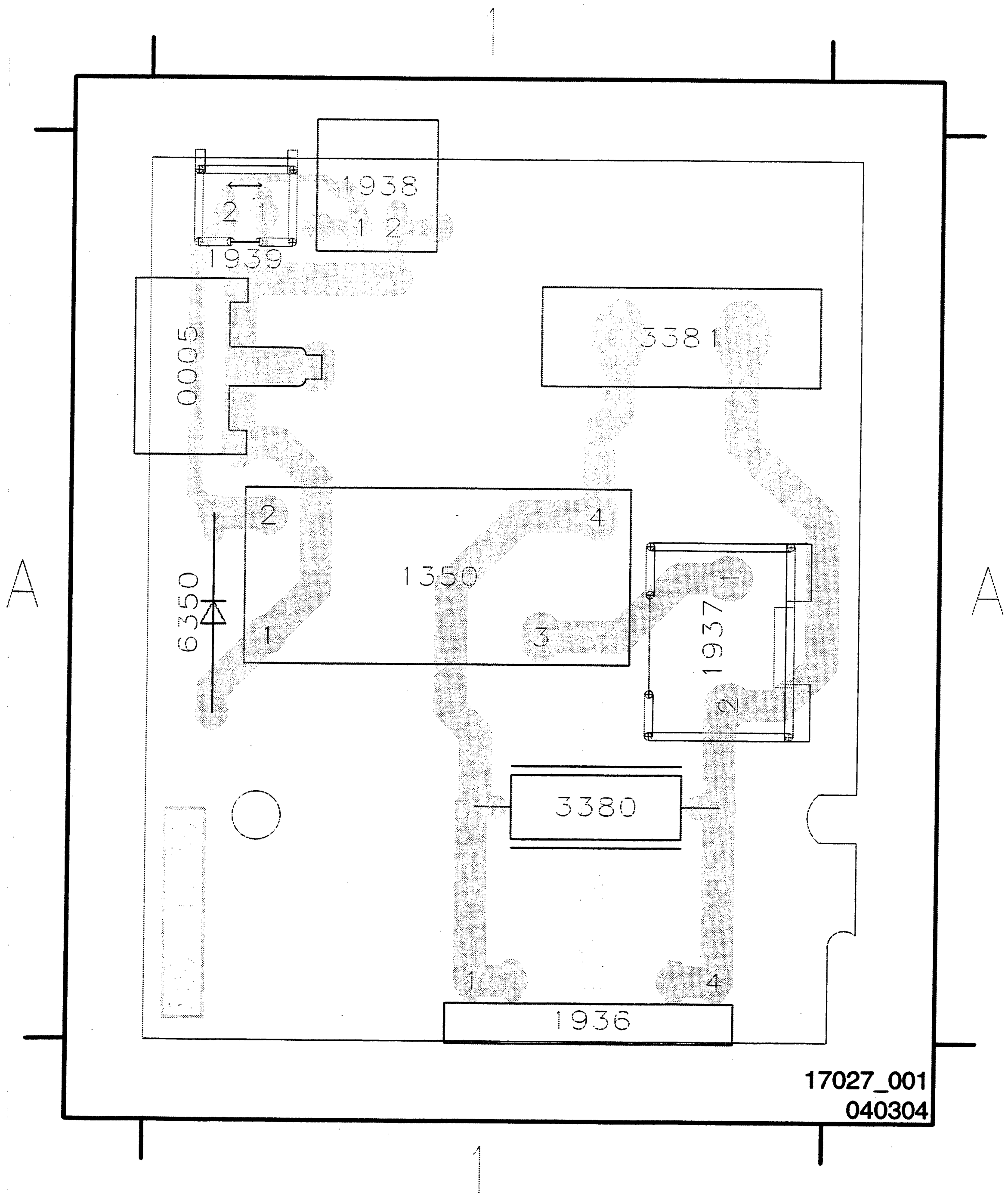
F391
1936
75209
from AB HDD
MAINS
3380
680K
3381
V
for NAFTA only
1350
LKS1AF
6350
BAV21
F394
1938
12V
GND
EH-S
1939
GND
12V
B2B-PH-K
FAN SUPPLY
F395
1937
F392
F393
B2P3-VH
to HDD
HDD SUPPLY
0005
BRACKET
17026_001
040304

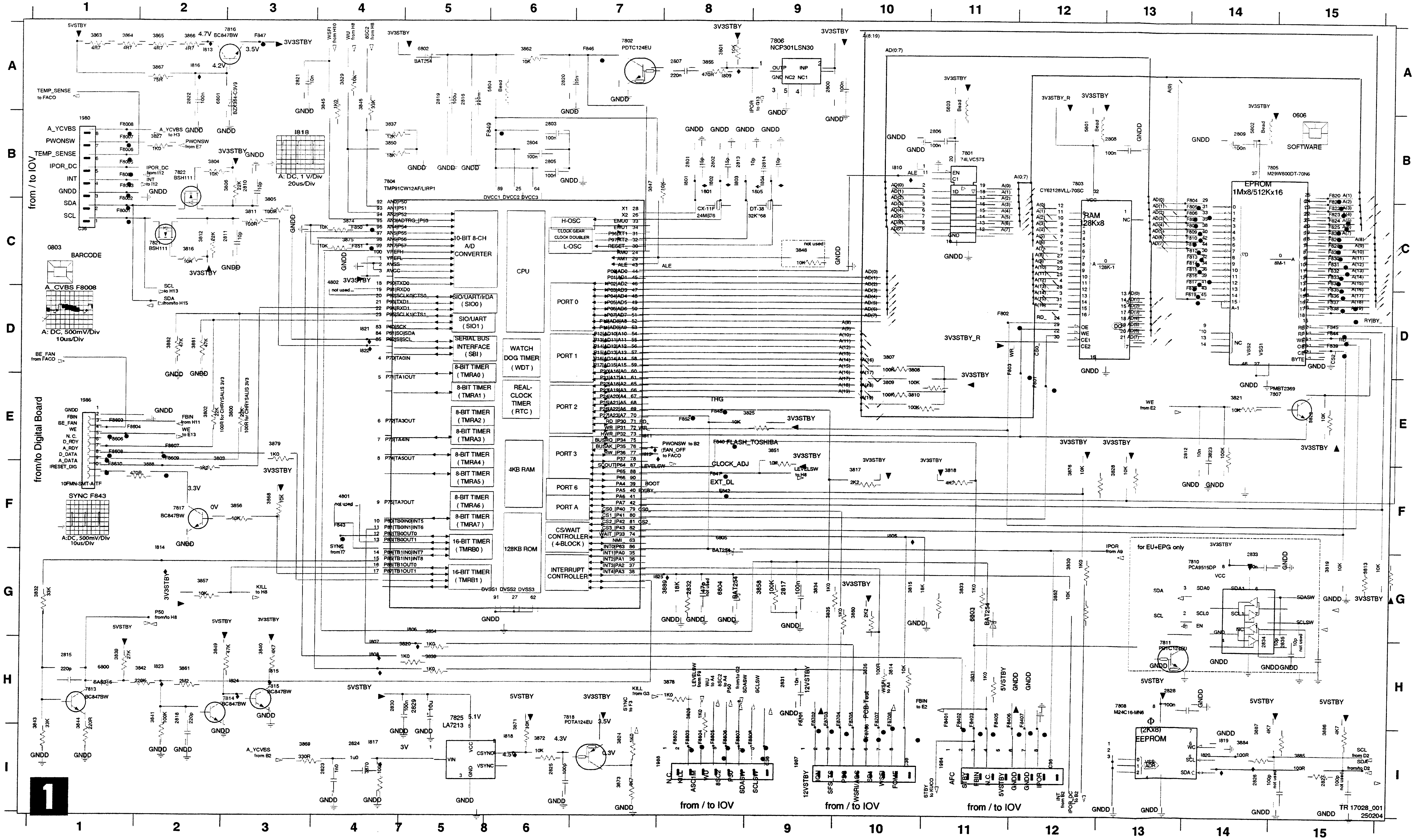
Layout Power Supply Interface

0005 A1	1937 A1	3380 A1
1350 A1	1938 A1	3381 A1
1936 A1	1939 A1	6350 A1


1
A
1938
1939
0005
3381
1350
6350
1937
3380
1936
17027_001
040304

UP Sub Board: Central Controller (CECO) Layout 603 3051.1

0606	B15
1801	B8
1805	B9
1980	B1
1984	I11
1986	E1
1987	I9
1988	I8
2800	A9
2801	B8
2802	B8
2803	B6
2804	B6
2805	B6
2806	B11
2807	A8
2808	B13
2809	B14
2810	B3
2811	C3
2812	E14
2813	B8
2814	B9
2815	H1
2816	A5
2817	G9
2818	H2
2819	A5
2820	A6
2821	A3
2822	A2
2823	I4
2824	I4
2825	I6
2826	I14
2827	I15
2828	H13
2829	H5
2830	H4
2831	H9
2832	G8
2833	G14
2834	H14
2835	H15
3800	E2
3801	A8
3802	E1
3803	E2
3804	B2
3805	C3
3806	B3
3807	D10
3808	D10
3809	E10
3810	E10
3811	C3
3812	C2
3813	G15
3814	H10
3815	G10
3816	C2
3817	F10
3818	F11
3819	G15
3820	H5
3821	E14
3822	E15
3823	E14
3824	I7
3825	E8
3826	H8
3827	B2
3828	F13
3829	A4
3830	G12
3831	H11
3832	G1
3833	G11
3834	G9
3835	G9
3836	H10
3837	B4
3838	H5
3839	H1
3840	H3
3841	H2
3842	H2
3843	I1
3844	I1
3845	A4
3846	A4
3847	B7
3848	C9
3849	H2
3850	B4
3851	E9
3852	G12
3854	G5
3855	A8
3856	F3
3857	G2
3858	G9
3860	G10
3861	H2
3862	A6
3863	A1
3864	A1
3865	A2
3866	A2
3867	A2
3868	F3
3869	I3
3870	I4
3871	I6
3872	I6
3873	I7
3874	C4
3875	C4
3876	F12
3878	H8
3879	E2
3881	D2
3882	D2
3884	I14
3885	I15
3886	I15
3887	I14
3888	F2
3889	G8
4801	F4
4802	C4
5801	B12
5802	B14
5803	A11
5804	A6
6800	H1
6801	A2
6802	A5
6803	G11
6804	G8
6805	F8
7801	B11
7802	A7
7803	B12
7804	B4
7805	B14
7806	A9
7807	E15
7808	H13
7810	G14
7811	H13
7813	H1
7814	H3
7815	H3
7816	A3
7817	F2
7818	H6
7821	C2
7822	B2
7825	H5
F8001	C1
F8002	C1
F8003	B1
F8004	B1
F8005	B1
F8006	B1
F8007	B1
F8008	B1
F801	E12
F802	D11
F803	D11
F804	B14
F805	C14
F806	C14
F807	C14
F808	C14
F809	C14
F810	C14
F811	C14
F812	C14
F813	C14
F814	C14
F815	C14
F816	C14
F817	C14
F818	C14
F819	D14
F820	B15
F821	B15
F822	C15
F823	C15
F824	C15
F825	C15
F826	C15
F827	C15
F828	C15
F829	C15
F830	C15
F831	C15
F832	C15
F833	C15
F834	C15
F835	C15
F836	D15
F837	D15
F838	D15
F839	D15
F840	E8
F8401	H11
F8402	H11
F8403	H11
F8405	H11
F8406	H12
F8407	H12
F841	F8
F842	F8
F843	F4
F844	D15
F845	D15
F846	A7
F847	A3
F848	E8
F849	B6
F850	C4
F851	C4
F852	E8
F8603	E1
F8604	E1
F8606	E1
F8607	E2
F8608	E1
F8609	E2
F8610	F1
F8701	H9
F8702	H9
F8703	H9
F8704	H10
F8705	H10
F8706	I10
F8707	H10
F8708	H10
F8802	I8
F8803	I8
F8804	I8
F8805	I8
F8806	I8
F8807	I8
F8808	I9
I801	B8
I802	B8
I803	B8
I804	B9
I805	F10
I806	G5
I807	H4
I808	H4
I809	A8
I810	B10
I811	E7
I812	E7
I813	A2
I814	F2
I815	H3
I816	A2
I817	I4
I818	I6
I819	I14
I820	I14
I821	D4
I822	D4
I823	H2
I824	H3
I825	G7



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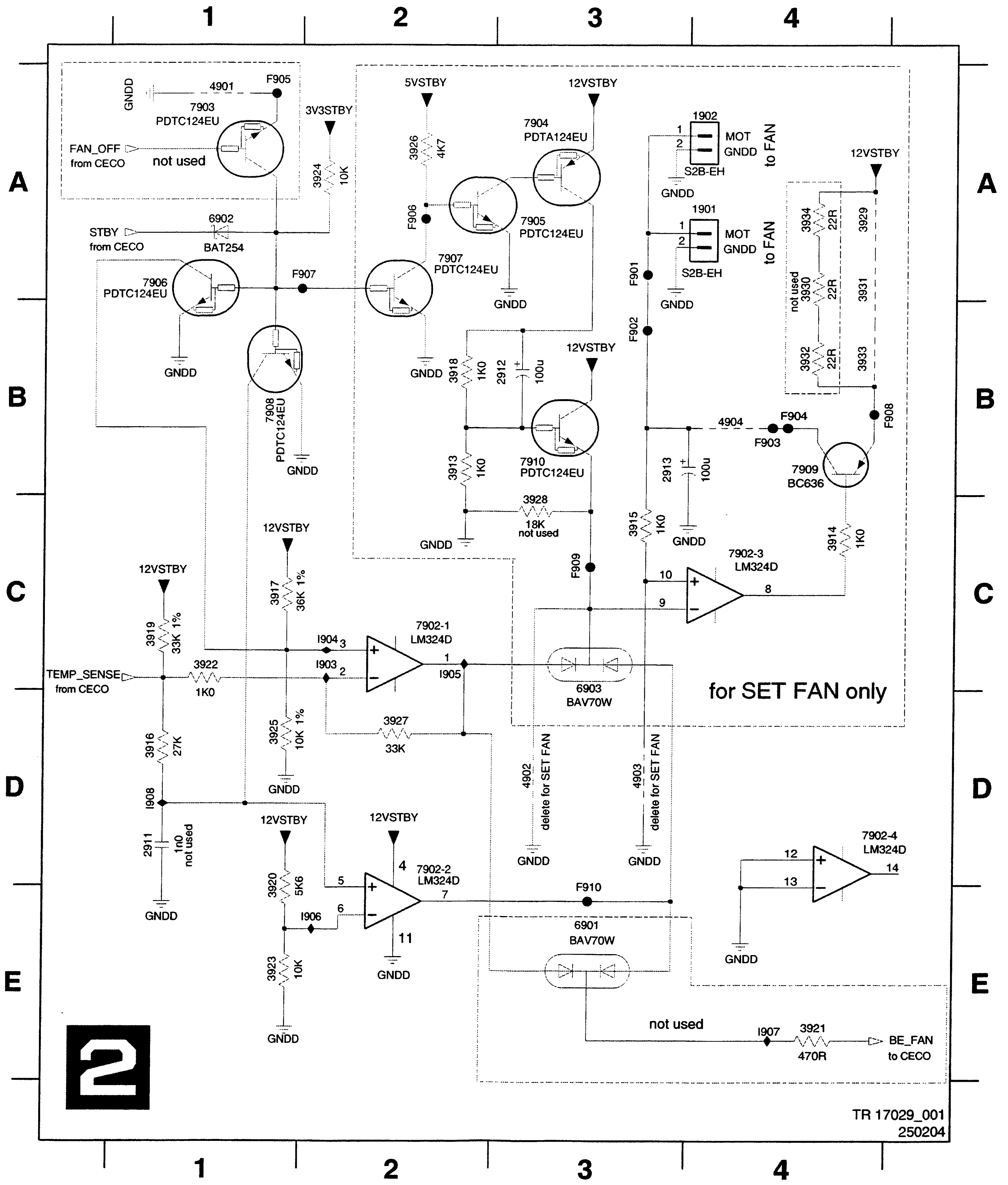
11
12
13
14
15
A
B
C
D
E
F
G
H
I
5VSTBY
3V3STBY
7816 BC847BW
TEMP_SENSE to FACO
A_YCVBS
PWONSW
TEMP_SENSE
IPOR_DC
INT
GNDD
SDA
SCL
from / to IOV
I818
A: DC, 1 V/Div 20us/Div
7804 TMP91CW12AF/LIRP1
0803
BARCODE
A_CVBS F8008
A: DC, 500mV/Div 10us/Div
BE_FAN from FACO
from/to Digital Board
SYNC F843
A:DC, 500mV/Div 10us/Div
7817 BC847BW
10-BIT 8-CH A/D CONVERTER
CPU
SIO/UART/IrDA (SIO0)
SIO/UART (SIO1)
SERIAL BUS INTERFACE (SBI)
WATCH DOG TIMER (WDT)
REAL-CLOCK TIMER (RTC)
8-BIT TIMER (TMRA0)
8-BIT TIMER (TMRA1)
8-BIT TIMER (TMRA2)
8-BIT TIMER (TMRA3)
8-BIT TIMER (TMRA4)
8-BIT TIMER (TMRA5)
8-BIT TIMER (TMRA6)
8-BIT TIMER (TMRA7)
16-BIT TIMER (TMRB0)
16-BIT TIMER (TMRB1)
4KB RAM
128KB ROM
H-OSC
CLOCK GEAR
CLOCK DOUBLER
L-OSC
PORT 0
PORT 1
PORT 2
PORT 3
PORT 6
PORT A
CS/WAIT CONTROLLER (4-BLOCK)
INTERRUPT CONTROLLER
7802 PDTC124EU
7806 NCP301LSN30
7801 74LVC573
7803 CY62128VLL-70SC
RAM 128Kx8
7805 M29W800DT-70N6
EPROM 1Mx8/512Kx16
0606 SOFTWARE
7807 PMBT2369
FLASH_TOSHIBA
CLOCK_ADJ
EXT_DL
LEVELSW
for EU+EPG only
7810 PCA9515DP
7811 PDTC124EU
7808 M24C16-MN6
(2Kx8) EEPROM
7825 LA7213
7818 PDTA124EU
7813 BC847BW
7814 BC847BW
7815 BC847BW
A_YCVBS from B2
from / to IOV
from / to IOV
from / to IOV
TR 17028_001 250204

UP Sub Board: Fan Control (FACO) Layout 603 3051.1

1901 A4	3915 C3	3922 C1	3929 A4	4902 D3	7902-2 D2	7907 A2	F904 B4	I903 C2
1902 A4	3916 D1	3923 E1	3930 A4	4903 D3	7902-3 C4	7908 B1	F905 A1	I904 C2
2911 D1	3917 C1	3924 A2	3931 A4	4904 B4	7902-4 D4	7909 B4	F906 A2	I905 C2
2912 B3	3918 B2	3925 D1	3932 B4	6901 E3	7903 A1	7910 B3	F907 A2	I906 E2
2913 B3	3919 C1	3926 A2	3933 B4	6902 A1	7904 A3	F901 A3	F908 B4	I907 E4
3913 B2	3920 E1	3927 D2	3934 A4	6903 C3	7905 A3	F902 B3	F909 C3	I908 D1
3914 C4	3921 E4	3928 C3	4901 A1	7902-1 C2	7906 A1	F903 B4	F910 E3	


1
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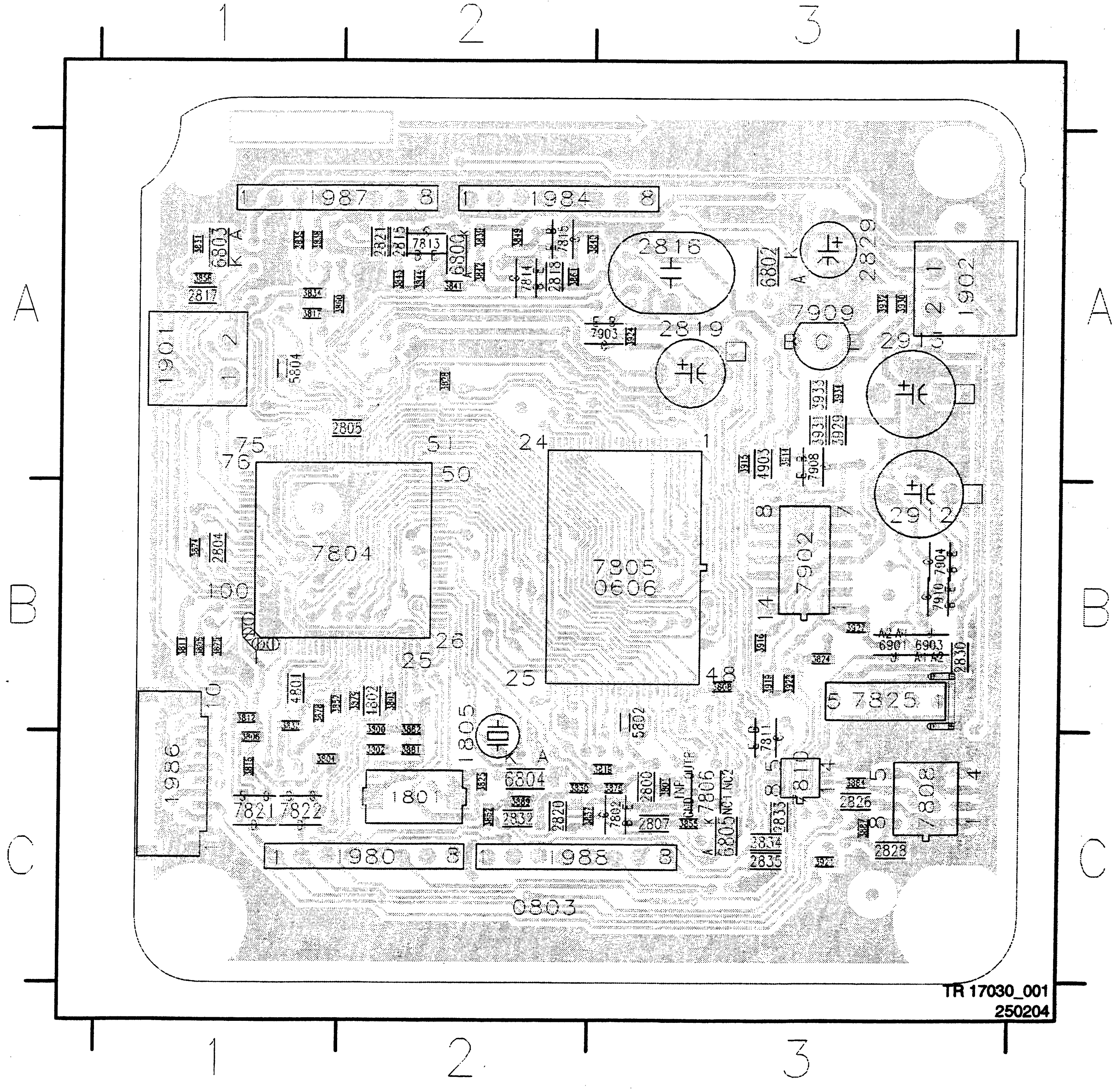
3
4
A
B
C
D
E
GNDD
4901
F905
7903
PDTC124EU
3V3STBY
FAN_OFF
from CECO
not used
3924
10K
STBY
from CECO
6902
BAT254
7906
PDTC124EU
F907
7908
PDTC124EU
5VSTBY
12VSTBY
3926
4K7
F906
7905
PDTC124EU
7904
PDTA124EU
7907
PDTC124EU
3918
1K0
2912
100u
7910
PDTC124EU
3913
1K0
3928
18K
not used
1902
MOT
GNDD
S2B-EH
to FAN
1901
MOT
GNDD
S2B-EH
to FAN
F901
F902
3934
22R
3929
not used
3930
22R
3931
3932
22R
3933
F908
4904
F904
F903
7909
BC636
2913
100u
3915
1K0
3914
1K0
7902-3
LM324D
F909
10
9
8
3917
36K 1%
3919
33K 1%
TEMP_SENSE
from CECO
3922
1K0
I904
I903
7902-1
LM324D
I905
6903
BAV70W
for SET FAN only
3927
33K
3916
27K
3925
10K 1%
4902
delete for SET FAN
4903
delete for SET FAN
I908
2911
1n0
not used
3920
5K6
I906
3923
10K
7902-2
LM324D
F910
6901
BAV70W
7902-4
LM324D
12
13
14
not used
I907
3921
470R
BE_FAN
to CECO
2
TR 17029_001
250204

Layout UP Sub Board (Top View) Layout 603 3051.1

0606	B3	2821	A2	3816	C1	3855	C3	3924	A3	7804	B2
0803	C2	2826	C3	3817	A1	3857	B1	3927	B3	7805	B3
1801	C2	2828	C3	3819	C3	3858	A1	3929	A3	7806	C3
1805	C2	2829	A3	3824	B3	3860	A1	3930	A3	7808	C3
1901	A1	2830	B3	3825	C2	3861	A2	3931	A3	7810	C3
1902	A3	2832	C2	3828	A2	3874	B1	3932	A3	7811	C3
1980	C2	2833	C3	3830	C2	3875	B1	3933	A3	7813	A2
1984	A2	2834	C3	3831	A1	3876	C3	3934	A3	7814	A2
1986	C1	2835	C3	3832	B1	3878	B1	4801	B1	7815	A2
1987	A1	2912	B3	3834	A1	3879	B2	4802	B2	7821	C1
1988	C2	2913	A3	3835	A1	3881	C2	4903	A3	7822	C1
2800	C3	3800	B2	3837	C2	3882	B2	5802	B3	7825	B3
2804	B1	3801	C3	3838	A1	3884	C3	5804	A1	7902	B3
2805	A2	3802	C2	3839	A2	3887	C3	6800	A2	7903	A3
2807	C3	3803	B2	3840	A2	3889	C2	6802	A3	7904	B3
2815	A2	3804	C1	3841	A2	3914	A3	6803	A1	7908	A3
2816	A3	3805	B1	3842	A2	3915	A3	6804	C2	7909	A3
2817	A1	3806	C1	3843	A2	3916	B3	6805	C3	7910	B3
2818	A2	3808	B3	3844	A2	3919	B3	6901	B3		
2819	A3	3811	B1	3849	A2	3921	C3	6903	B3		
2820	C2	3812	B1	3852	C2	3922	B3	7802	C3		


1
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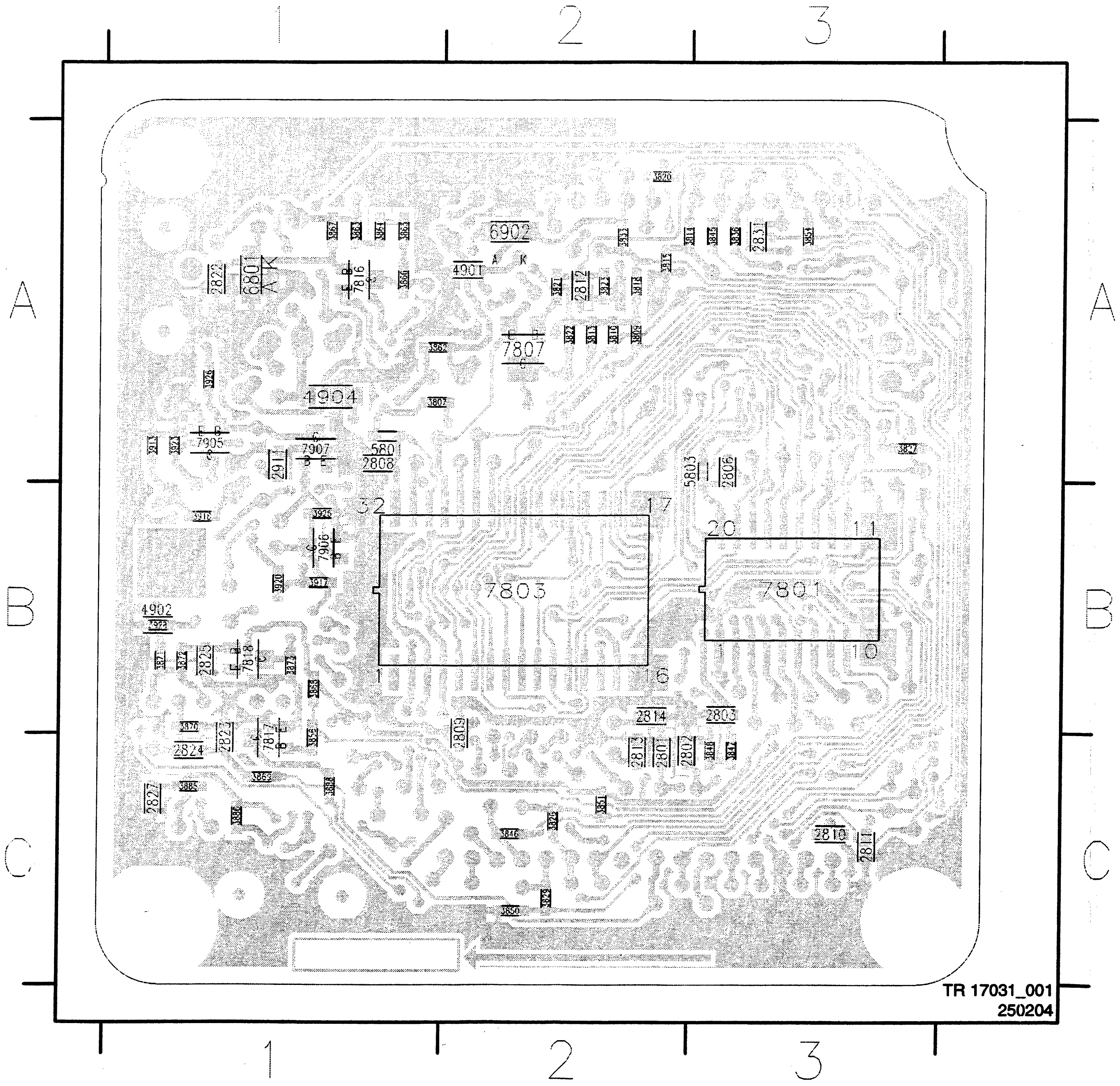
A
B
C
1987
1984
1986
1980
1988
1901
1902
1801
1805
2816
2819
2829
2913
2912
7804
7805
0606
7902
7909
7825
7808
7806
7821
7822
6803
6804
6802
6800
6805
2805
2804
5804
5802
TR 17030_001
250204

Layout UP Sub Board (Bottom View) Layout 603 3051.1

2801	C2	2825	B1	3823	A2	3862	A1	3888	C1	6801	A1
2802	C3	2827	C1	3826	C2	3863	A1	3913	A1	6902	A2
2803	B3	2831	A3	3827	A3	3864	A1	3917	B1	7801	B3
2806	A3	2911	A1	3829	C2	3865	A1	3918	B1	7803	B2
2808	A1	3807	A1	3833	A2	3866	A1	3920	B1	7807	A2
2809	B2	3809	A2	3836	A3	3867	A1	3923	A1	7816	A1
2810	C3	3810	A2	3845	A3	3868	B1	3925	B1	7817	C1
2811	C3	3813	A2	3846	C2	3869	C1	3926	A1	7818	B1
2812	A2	3814	A2	3847	C3	3870	B1	3928	B1	7905	A1
2813	C2	3815	A2	3848	C3	3871	B1	4901	A2	7906	B1
2814	B2	3818	A2	3850	C2	3872	B1	4902	B1	7907	A1
2822	A1	3820	A2	3851	C2	3873	B1	4904	A1		
2823	C1	3821	A2	3854	A3	3885	C1	5801	A1		
2824	C1	3822	A2	3856	C1	3886	C1	5803	A2		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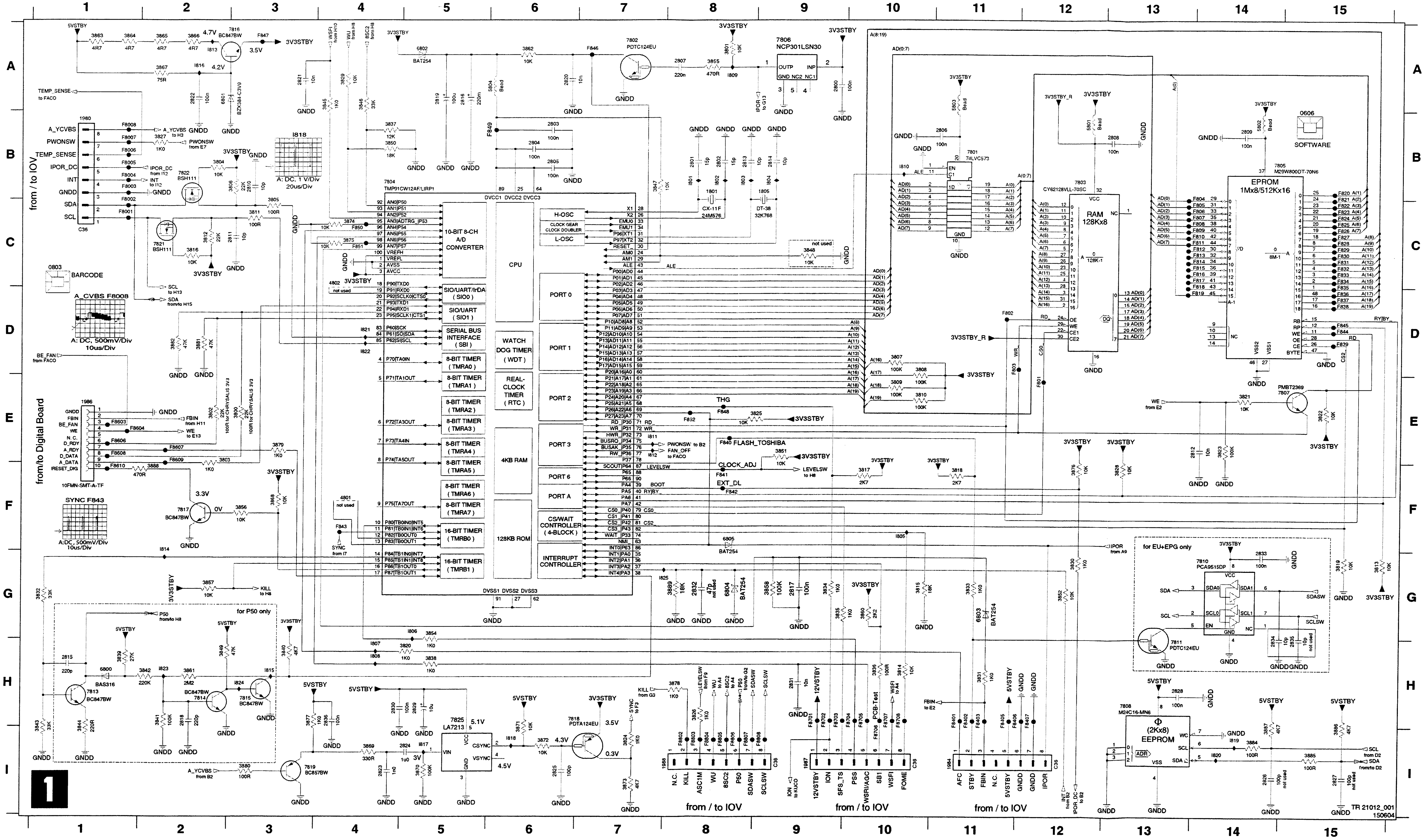
A
B
C
6902
6801
2822
4901
7816
2812
7807
2831
4904
7905
7907
2911
5801
2808
5803
2806
7803
7801
32
17
20
11
1
16
10
7906
4902
2825
7818
2814
2803
2824
2823
7817
2809
2813
2801
2802
2827
2810
2811

TR 17031_001
250204

UP Sub Board: Central Controller (CECO) Layout 603 3051.2

0606 B15	2800 A9	2809 B14	2818 H2	2827 I15	2836 H4	3808 D10	3817 F10	3826 H8	3835 G9	3844 I1	3854 G5	3864 A1	3873 I7	3882 D2	5801 B12	6805 F8	7810 G14	7821 C2	F8007 B1	F808 C14	F817 C14	F826 C15	F835 D15	F8405 H11	F847 A3	F8607 E2	F8706 I10	F8808 I9	I809 A8	I818 I6
0803 C1	2801 B8	2810 B3	2819 A5	2828 H13	3800 E3	3809 E10	3818 F11	3827 B2	3836 H10	3845 A4	3855 A8	3865 A2	3874 C4	3884 I14	5802 B14	7801 B11	7811 H13	7822 B2	F8008 B1	F809 C14	F818 D14	F827 C15	F836 D15	F8406 H12	F848 E8	F8608 E1	F8707 H10	I801 B8	I810 B10	I819 I14
1801 B8	2802 B8	2811 C3	2820 A6	2829 H5	3801 A8	3810 E10	3819 G15	3828 F13	3837 B4	3846 A4	3856 F3	3866 A2	3875 C4	3885 I15	5803 A11	7802 A7	7813 H1	7825 H5	F801 E12	F810 C14	F819 D14	F828 C15	F837 D15	F8407 H12	F849 B6	F8609 E2	F8708 H10	I802 B8	I811 E7	I820 I14
1805 B9	2803 B6	2812 E14	2821 A3	2830 H4	3802 E2	3811 C3	3820 H5	3829 A4	3838 H5	3847 B7	3857 G2	3867 A2	3876 F12	3886 I15	5804 A6	7803 B12	7814 H3	F8001 C1	F802 D11	F811 C14	F820 B15	F829 C15	F838 D15	F841 F8	F850 C4	F8610 F1	F8802 I8	I803 B8	I812 E7	I821 D4
1980 B1	2804 B6	2813 B8	2822 A2	2831 H9	3803 E2	3812 C2	3821 E14	3830 G12	3839 H1	3848 C9	3858 G9	3868 F3	3877 H3	3887 I14	6800 H1	7804 B4	7815 H3	F8002 C1	F803 D11	F812 C14	F821 C15	F830 C15	F839 D15	F842 F8	F851 C4	F8701 H9	F8803 I8	I804 B9	I813 A2	I822 D4
1984 I11	2805 B6	2814 B9	2823 I4	2832 G8	3804 B2	3813 G15	3822 E15	3831 H11	3840 H3	3849 H2	3860 G10	3869 I4	3878 H8	3888 F2	6801 A2	7805 B14	7816 A3	F8003 B1	F804 C14	F813 C14	F822 C15	F831 C15	F840 E8	F843 F4	F852 E8	F8702 H9	F8804 I8	I805 F10	I814 F2	I823 H2
1986 E1	2806 B11	2815 H1	2824 I5	2833 G14	3805 C3	3814 H10	3823 E14	3832 G1	3841 H2	3850 B4	3861 H2	3870 I5	3879 E3	3889 G8	6802 A5	7806 A9	7817 F2	F8004 B1	F805 C14	F814 C14	F823 C15	F832 C15	F8401 H11	F844 D15	F8603 E1	F8703 H9	F8805 I8	I806 G5	I815 H3	I824 H3
1987 I9	2807 A8	2816 A5	2825 I6	2834 H14	3806 B3	3815 G10	3824 I7	3833 G11	3842 H2	3851 E9	3862 A6	3871 I6	3880 I3	4801 F4	6803 G11	7807 E15	7818 H6	F8005 B1	F806 C14	F815 C14	F824 C15	F833 C15	F8402 H11	F845 D15	F8604 E1	F8704 H10	F8806 I8	I807 H4	I816 A2	I825 G7
1988 I8	2808 B13	2817 G9	2826 I14	2835 H15	3807 D10	3816 C2	3825 E9	3834 G9	3843 I1	3852 G12	3863 A1	3872 I6	3881 D2	4802 C4	6804 G8	7808 H13	7819 I3	F8006 B1	F807 C14	F816 C14	F825 C15	F834 C15	F8403 H11	F846 A7	F8606 E1	F8705 H10	F8807 I8	I808 H4	I817 I5	



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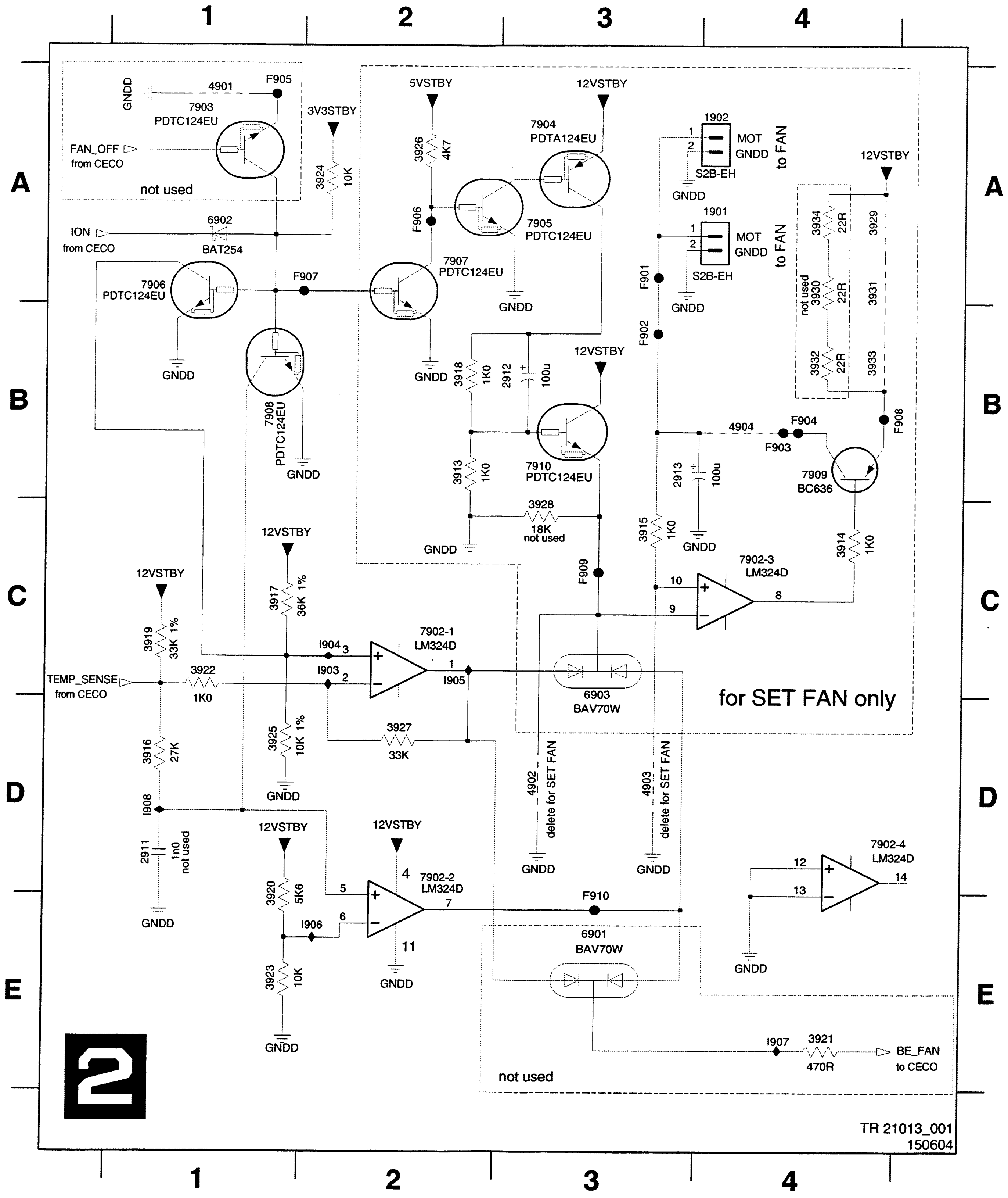
A B C D E F G H I
5VSTBY
3V3STBY
7816 BC847BW
7802 PDTC124EU
7806 NCP301LSN30
from / to IOV
from/to Digital Board
1980
1986
TEMP_SENSE to FACO
A_YCVBS
PWONSW
TEMP_SENSE
IPOR_DC
INT
GNDD
SDA
SCL
7822 BSH111
7821 BSH111
0803 BARCODE
A_CVBS F8008
A: DC, 500mV/Div 10us/Div
I818
A: DC, 1 V/Div 20us/Div
BE_FAN from FACO
SYNC F843
A:DC, 500mV/Div 10us/Div
7817 BC847BW
3.3V
0V
7804 TMP91CW12AF/LRP1
10-BIT 8-CH A/D CONVERTER
CPU
H-OSC
L-OSC
SIO/UART/IrDA (SIO0)
SIO/UART (SIO1)
SERIAL BUS INTERFACE (SBI)
WATCH DOG TIMER (WDT)
REAL-CLOCK TIMER (RTC)
8-BIT TIMER (TMRA0)
8-BIT TIMER (TMRA1)
8-BIT TIMER (TMRA2)
8-BIT TIMER (TMRA3)
8-BIT TIMER (TMRA4)
8-BIT TIMER (TMRA5)
8-BIT TIMER (TMRA6)
8-BIT TIMER (TMRA7)
16-BIT TIMER (TMRB0)
16-BIT TIMER (TMRB1)
4KB RAM
128KB ROM
PORT 0
PORT 1
PORT 2
PORT 3
PORT 6
PORT A
CS/WAIT CONTROLLER (4-BLOCK)
INTERRUPT CONTROLLER
DVCC1 DVCC2 DVCC3
DVSS1 DVSS2 DVSS3
1801 CX-11F 24M576
1805 DT-38 32K768
7801 74LVC573
7803 CY62128VLL-70SC
RAM 128Kx8
7805 M29W800DT-70N6
EPROM 1Mx8/512Kx16
0606 SOFTWARE
THG
FLASH_TOSHIBA
CLOCK_ADJ
EXT_DL
BOOT
LEVELSW
7807 PMBT2369
for EU+EPG only
7810 PCA9515DP
7811 PDTC124EU
for P50 only
7813 BC847BW
7814 BC847BW
7815 BC847BW
7819 BC857BW
7825 LA7213
5.1V
4.5V
7818 PDTA124EU
3.5V
4.3V
0.3V
7808 M24C16-MN6
(2Kx8) EEPROM
1988
1987
1984
N.C. KILL ASC1M WU 8SC2 P50 SDASW SCLSW
ION 12VSTBY ION SFS_TS PSS WSRI/AGC SB1 WSFI FOME
AFC STBY FBIN N.C. 5VSTBY GNDD GNDD IPOR
from / to IOV
from / to IOV
from / to IOV
TR 21012_001 150604
1

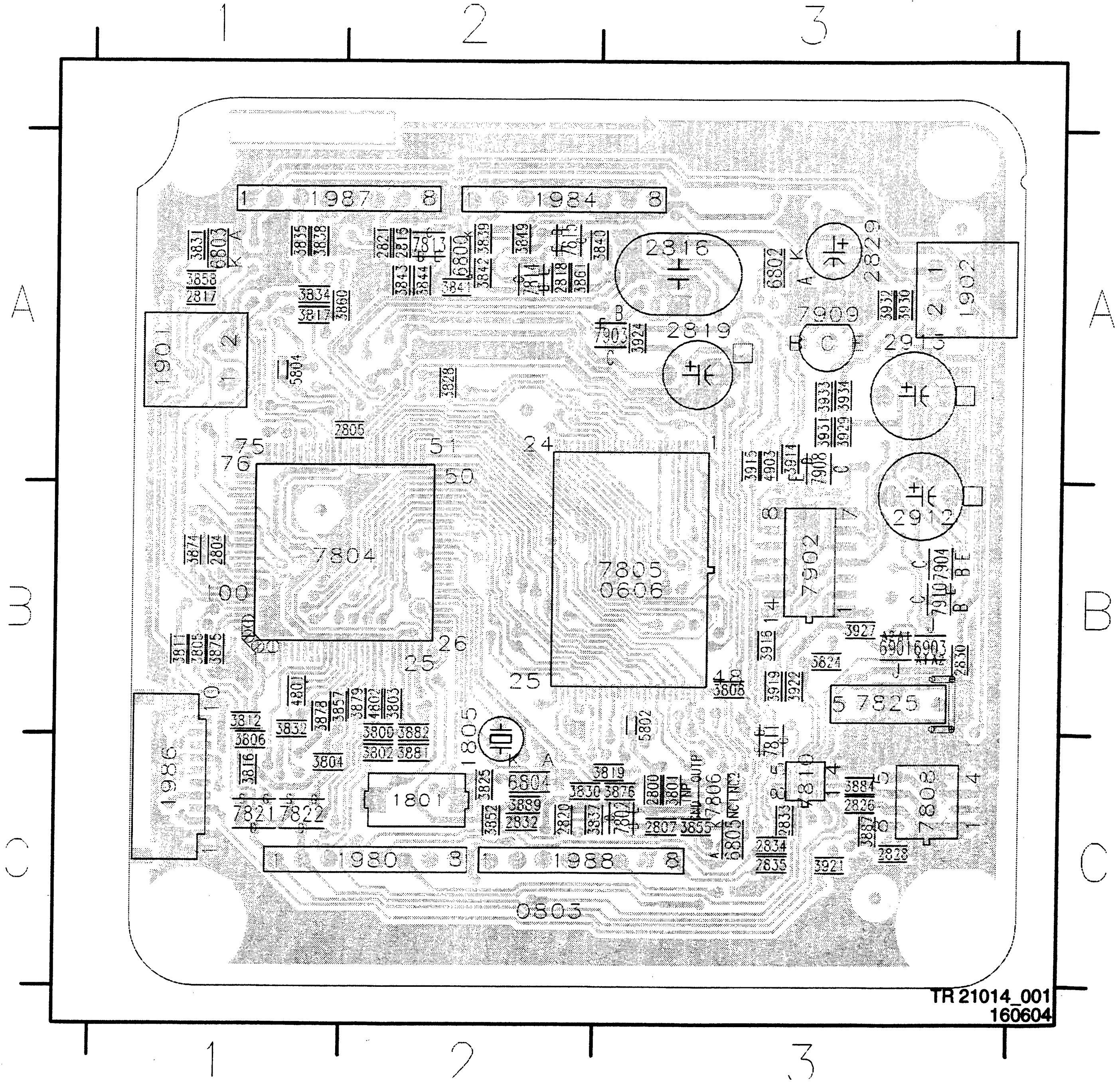
UP Sub Board: Fan Control (FACO) Layout 603 3051.2

1901	A4
1902	A4
2911	D1
2912	B3
2913	B3
3913	B2
3914	C4
3915	C3
3916	D1
3917	C1
3918	B2
3919	C1
3920	E1
3921	E4
3922	C1
3923	E1
3924	A2
3925	D1
3926	A2
3927	D2
3928	C3
3929	A4
3930	A4
3931	A4
3932	B4
3933	B4
3934	A4
4901	A1
4902	D3
4903	D3
4904	B4
6901	E3
6902	A1
6903	C3
7902-1	C2
7902-2	D2
7902-3	C4
7902-4	D4
7903	A1
7904	A3
7905	A3
7906	A1
7907	A2
7908	B1
7909	B4
7910	B3
F901	A3
F902	B3
F903	B4
F904	B4
F905	A1
F906	A2
F907	A2
F908	B4
F909	C3
F910	E3
I903	C2
I904	C2
I905	C2
I906	E2
I907	E4
I908	D1


1
2
3
4
A
B
C
D
E
GNDD
4901
F905
7903
PDTC124EU
FAN_OFF
from CECO
not used
3V3STBY
3924
10K
ION
from CECO
6902
BAT254
7906
PDTC124EU
F907
GNDD
7908
PDTC124EU
5VSTBY
3926
4K7
F906
12VSTBY
7904
PDTA124EU
7905
PDTC124EU
7907
PDTC124EU
3918
1K0
2912
100u
3913
1K0
7910
PDTC124EU
3928
18K
not used
F909
1902
MOT
GNDD
S2B-EH
to FAN
1901
F901
F902
4904
F904
F903
2913
3915
7909
BC636
3929
3934
22R
3930
3931
3932
3933
F908
3914
7902-3
LM324D
6903
BAV70W
for SET FAN only
3919
33K 1%
3917
36K 1%
TEMP_SENSE
3922
1K0
I904
I903
7902-1
LM324D
I905
3925
10K 1%
3927
33K
3916
27K
I908
2911
1n0
4902
delete for SET FAN
4903
7902-2
LM324D
3920
5K6
I906
3923
10K
F910
6901
7902-4
I907
3921
470R
BE_FAN
to CECO
2
TR 21013_001
150604

Layout UP Sub Board (Top View) Layout 603 3051.2

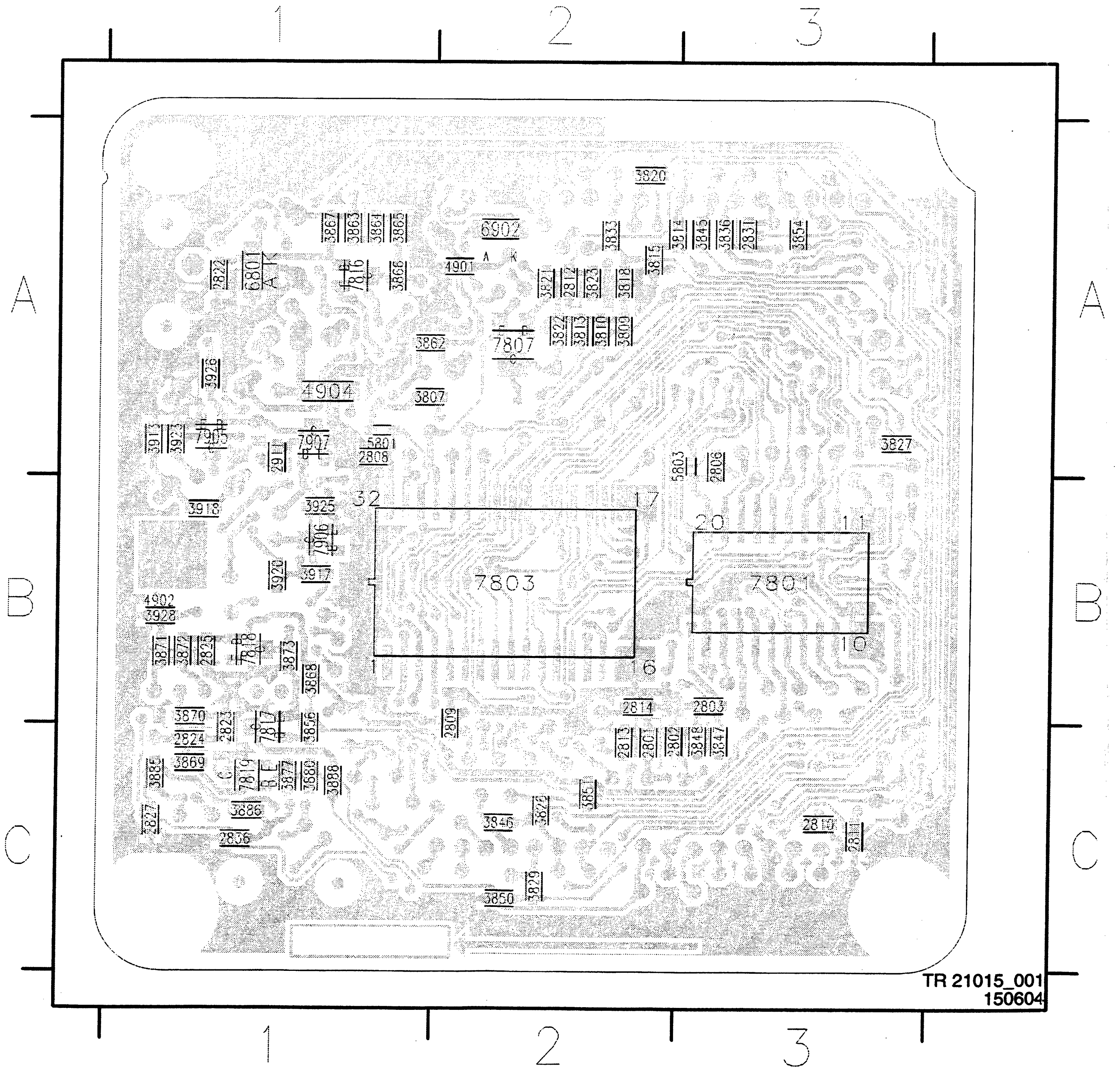
0606	B3	2821	A2	3816	C1	3855	C3	3924	A3	7804	B2
0803	C2	2826	C3	3817	A1	3857	B1	3927	B3	7805	B3
1801	C2	2828	C3	3819	C3	3858	A1	3929	A3	7806	C3
1805	C2	2829	A3	3824	B3	3860	A1	3930	A3	7808	C3
1901	A1	2830	B3	3825	C2	3861	A2	3931	A3	7810	C3
1902	A3	2832	C2	3828	A2	3874	B1	3932	A3	7811	C3
1980	C2	2833	C3	3830	C2	3875	B1	3933	A3	7813	A2
1984	A2	2834	C3	3831	A1	3876	C3	3934	A3	7814	A2
1986	C1	2835	C3	3832	B1	3878	B1	4801	B1	7815	A2
1987	A1	2912	B3	3834	A1	3879	B2	4802	B2	7821	C1
1988	C2	2913	A3	3835	A1	3881	C2	4903	A3	7822	C1
2800	C3	3800	B2	3837	C2	3882	B2	5802	B3	7825	B3
2804	B1	3801	C3	3838	A1	3884	C3	5804	A1	7902	B3
2805	A2	3802	C2	3839	A2	3887	C3	6800	A2	7903	A3
2807	C3	3803	B2	3840	A2	3889	C2	6802	A3	7904	B3
2815	A2	3804	C1	3841	A2	3914	A3	6803	A1	7908	A3
2816	A3	3805	B1	3842	A2	3915	A3	6804	C2	7909	A3
2817	A1	3806	C1	3843	A2	3916	B3	6805	C3	7910	B3
2818	A2	3808	B3	3844	A2	3919	B3	6901	B3		
2819	A3	3811	B1	3849	A2	3921	C3	6903	B3		
2820	C2	3812	B1	3852	C2	3922	B3	7802	C3		



TR 21014_001
160604

Layout UP Sub Board (Bottom View) Layout 603 3051.2

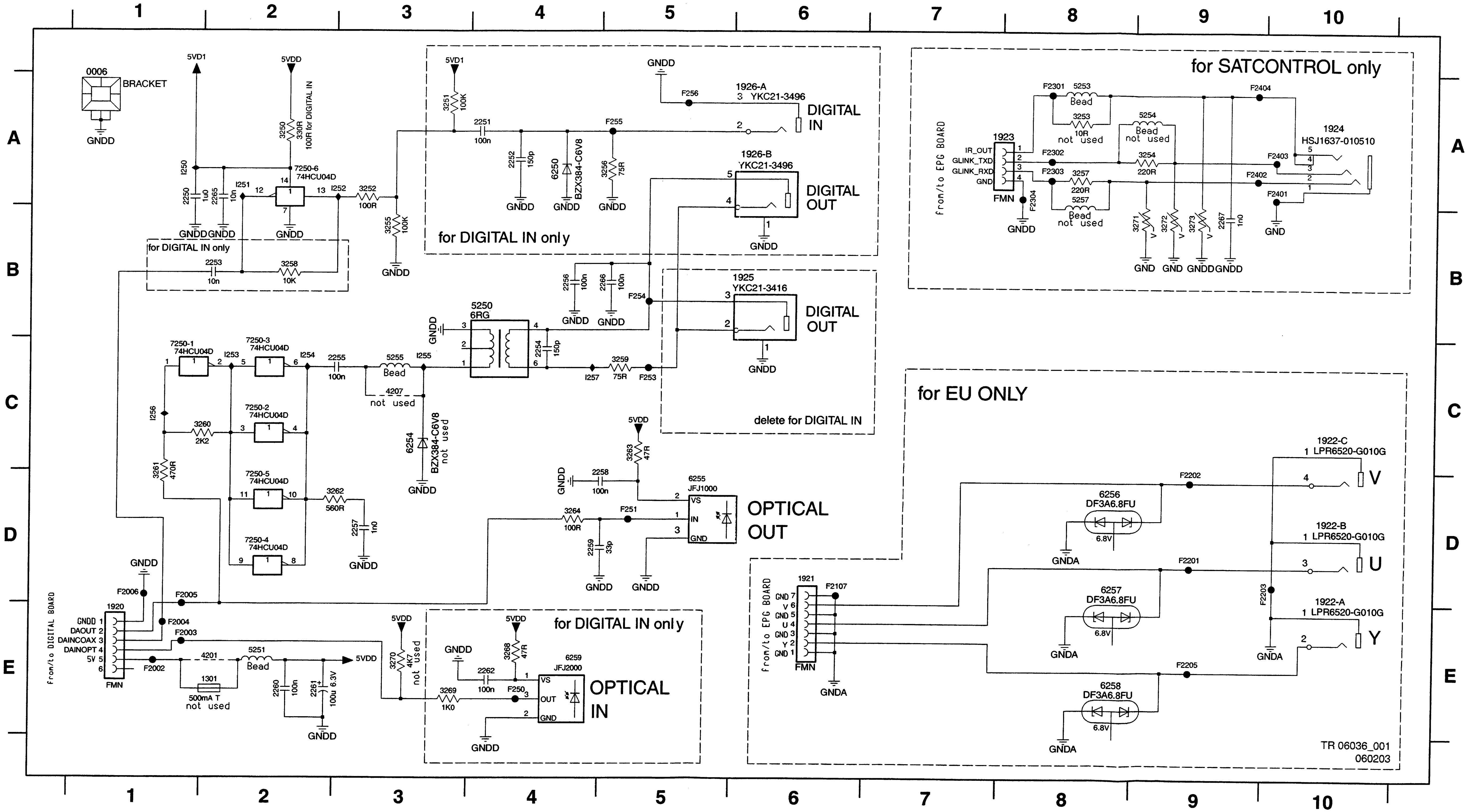
2801	C2	2827	C1	3826	C2	3864	A1	3913	A1	7801	B3
2802	C2	2831	A3	3827	A3	3865	A1	3917	B1	7803	B2
2803	B3	2836	C1	3829	C2	3866	A1	3918	B1	7807	A2
2806	A3	2911	A1	3833	A2	3867	A1	3920	B1	7816	A1
2808	A1	3807	A1	3836	A3	3868	B1	3923	A1	7817	C1
2809	B2	3809	A2	3845	A3	3869	C1	3925	B1	7818	B1
2810	C3	3810	A2	3846	C2	3870	B1	3926	A1	7819	C1
2811	C3	3813	A2	3847	C3	3871	B1	3928	B1	7905	A1
2812	A2	3814	A2	3848	C3	3872	B1	4901	A2	7906	B1
2813	C2	3815	A2	3850	C2	3873	B1	4902	B1	7907	A1
2814	B2	3818	A2	3851	C2	3877	C1	4904	A1		
2822	A1	3820	A2	3854	A3	3880	C1	5801	A1		
2823	C1	3821	A2	3856	C1	3885	C1	5803	A2		
2824	C1	3822	A2	3862	A1	3886	C1	6801	A1		
2825	B1	3823	A2	3863	A1	3888	C1	6902	A2		


1
2
3
A
B
C
3820
3867
3863
3864
3865
6902
3833
3814
3845
3836
2831
3854
2822
6801
7816
3866
4901
3821
2812
3823
3818
3815
3862
7807
3822
3813
3810
3809
3926
4904
3807
3913
3923
7905
2911
7907
5801
2808
5803
2806
3827
3918
3925
7906
3920
3917
32
17
7803
1
16
20
11
7801
10
4902
3928
3871
3872
2825
7818
3873
3868
3870
2824
2823
7817
3856
3869
7819
3877
3880
3888
3885
3886
3827
2836
2809
2814
2803
2813
2801
2802
3848
3847
3851
3846
3826
2810
2811
3850
3829

TR 21015_001
150604

In/Out Extension Board IOE

0006	A1
1301	E2
1920	E1
1921	D6
1922-A	D10
1922-B	D10
1922-C	C10
1923	A8
1924	A10
1925	B5
1926-A	A6
1926-B	A6
2250	A1
2251	A4
2252	A4
2253	B2
2254	C4
2255	C3
2256	B4
2257	D3
2258	D5
2259	D4
2260	E2
2261	E2
2262	E4
2265	A2
2266	B5
2267	B9
3250	A2
3251	A3
3252	A3
3253	A8
3254	A9
3255	B3
3256	A5
3257	A8
3258	B2
3259	C5
3260	C2
3261	D1
3262	D3
3263	C5
3264	D4
3268	E4
3269	E3
3270	E3
3271	B9
3272	B9
3273	B9
4201	E2
4207	C3
5250	B4
5251	E2
5253	A8
5254	A9
5255	C3
5257	A8
6250	A4
6254	C3
6255	D5
6256	D8
6257	D8
6258	E8
6259	E4
7250-1	C1
7250-2	C2
7250-3	C2
7250-4	D2
7250-5	D2
7250-6	A2
F2002	E1
F2003	E1
F2004	E1
F2005	D1
F2006	D1
F2107	D6
F2201	D9
F2202	D9
F2203	D10
F2205	E9
F2301	A8
F2302	A8
F2303	A8
F2304	A8
F2401	A10
F2402	A9
F2403	A10
F2404	A9
F250	E4
F251	D5
F253	C5
F254	B5
F255	A5
F256	A5
I250	A1
I251	A2
I252	A3
I253	C2
I254	C2
I255	C3
I256	C1
I257	C4


1
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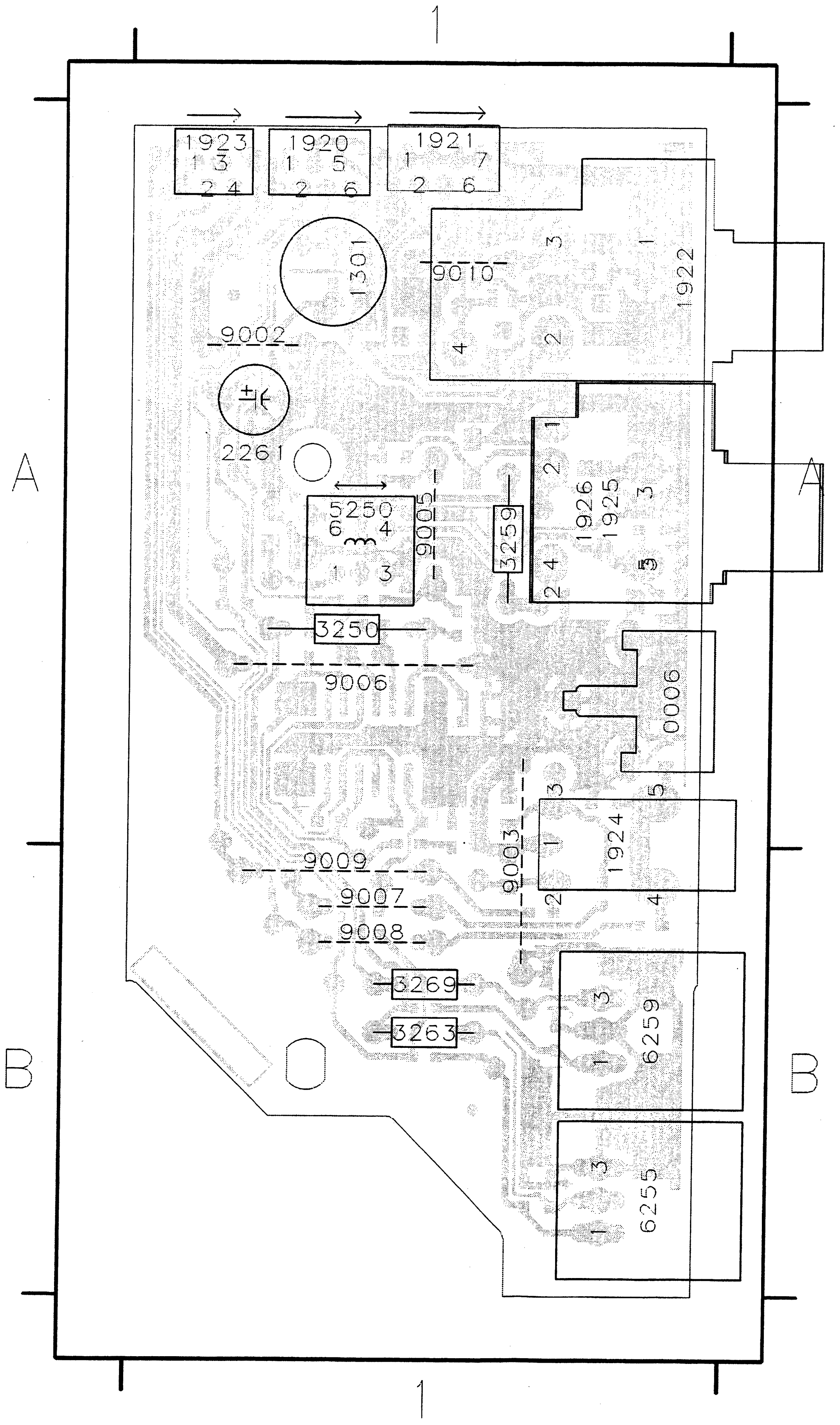
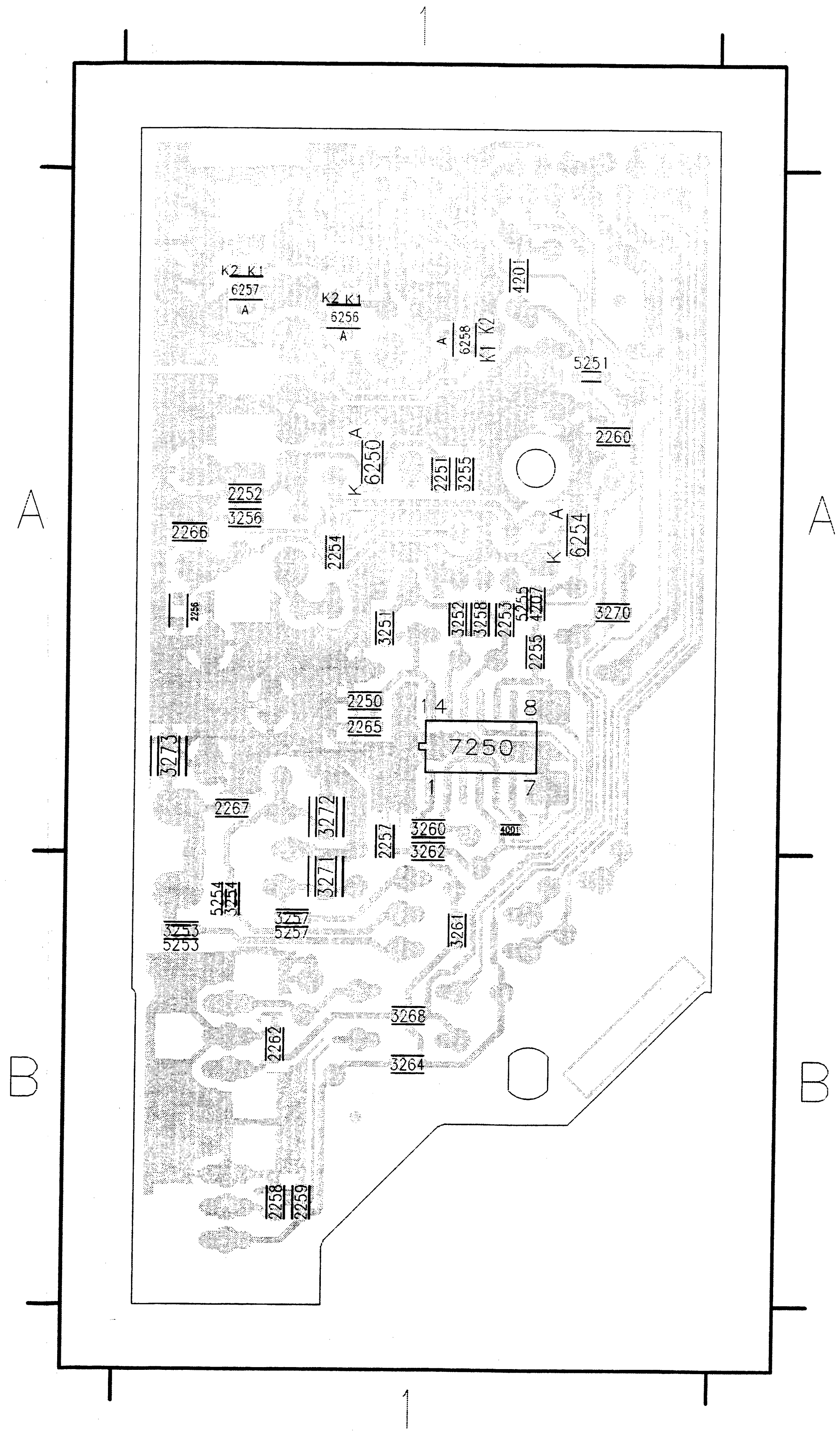
3
4
5
6
7
8
9
10
A
B
C
D
E
0006
BRACKET
GNDD
5VD1
5VDD
3250 330R 100R for DIGITAL IN
7250-6 74HCU04D
I250
I251
I252
2250 1u0
2265 10n
3252 100R
3255 100K
for DIGITAL IN only
2253 10n
3258 10K
3251 100K
2251 100n
2252 150p
6250 BZX384-C6V8
3256 75R
F255
F256
1926-A 3 YKC21-3496
DIGITAL IN
1926-B YKC21-3496
DIGITAL OUT
for DIGITAL IN only
2256 100n
2266 100n
F254
1925 YKC21-3416
DIGITAL OUT
delete for DIGITAL IN
5250 6RG
7250-1 74HCU04D
7250-3 74HCU04D
7250-2 74HCU04D
7250-5 74HCU04D
7250-4 74HCU04D
I253
I254
I255
I256
I257
2255 100n
5255 Bead
4207 not used
6254 BZX384-C6V8 not used
2254 150p
3259 75R
F253
3260 2K2
3261 470R
3262 560R
2257 1n0
5VDD
3263 47R
2258 100n
6255 JFJ1000
VS
IN
GND
OPTICAL OUT
3264 100R
F251
2259 33p
from/to DIGITAL BOARD
1920
GNDD 1
DAOUT 2
DAINCOAX 3
DAINOPT 4
5V 5
6
FMN
F2006
F2005
F2004
F2003
F2002
4201
5251 Bead
1301 500mA T not used
2260 100n
2261 100u 6.3V
3270 4K7 not used
3269 1K0
F250
for DIGITAL IN only
2262 100n
3268 47R
6259 JFJ2000
VS
OUT
GND
OPTICAL IN
for SATCONTROL only
from/to EPG BOARD
1923
IR_OUT
GLINK_TXD
GLINK_RXD
GND
FMN
F2301
F2302
F2303
F2304
5253 Bead
3253 10R not used
5254 Bead not used
3254 220R
3257 220R
5257 Bead not used
3271
3272
3273
2267 1n0
F2404
F2403
F2402
F2401
1924 HSJ1637-010510
GND
GNDD
for EU ONLY
from/to EPG BOARD
1921
GND 7
V 6
GND 5
U 4
GND 3
Y 2
GND 1
FMN
F2107
GNDA
6256 DF3A6.8FU
6257 DF3A6.8FU
6258 DF3A6.8FU
6.8V
F2202
F2201
F2205
F2203
1922-C 1 LPR6520-G010G
1922-B 1 LPR6520-G010G
1922-A 1 LPR6520-G010G
V
U
Y
TR 06036_001 060203

Layout In / Out Extension Board


1
A
B
1923
1920
1921
1301
1922
9010
9002
2261
5250
9005
3259
1926
1925
3250
9006
0006
1924
9003
9009
9007
9008
3269
3263
6259
6255

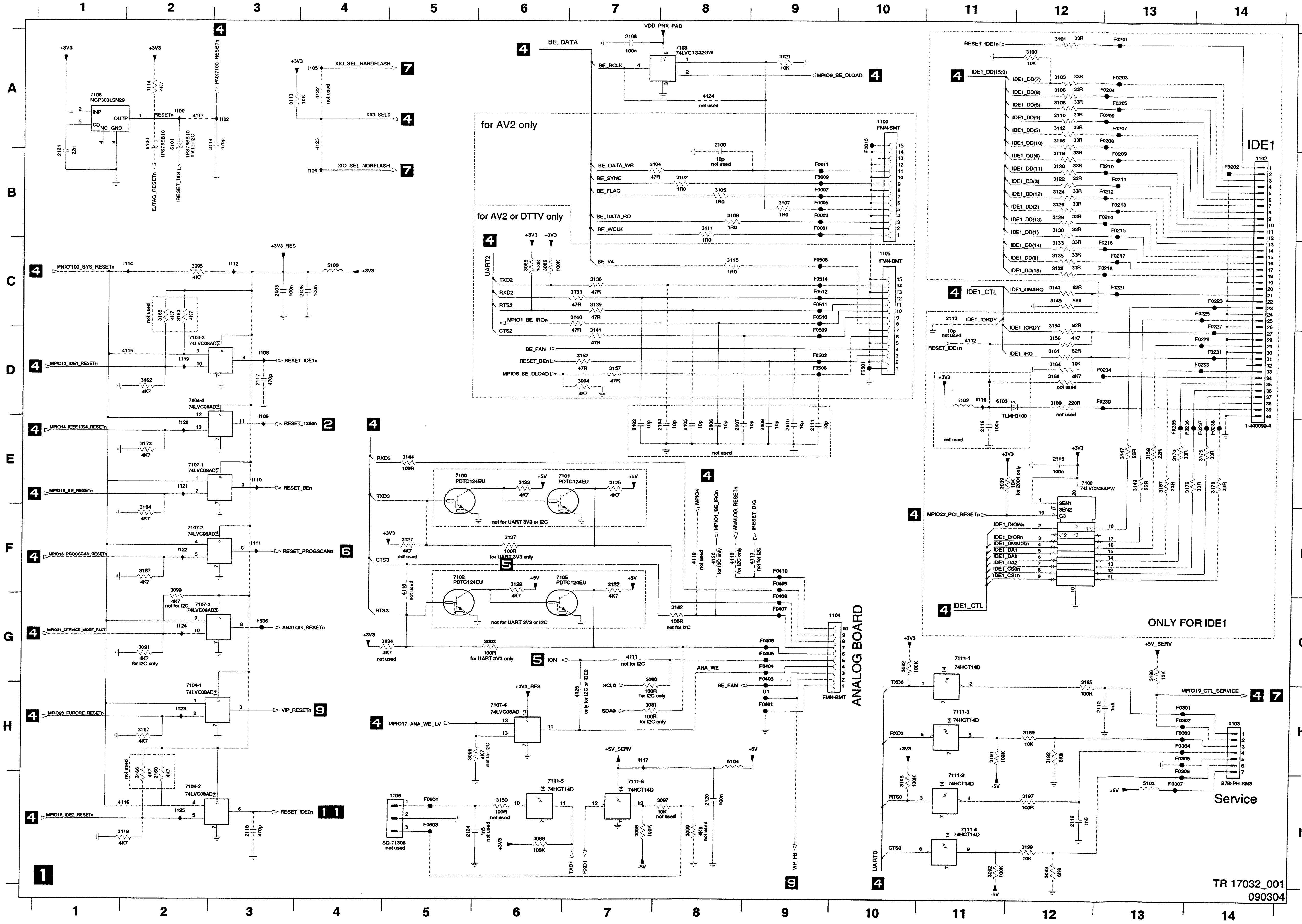
0006	A1
1301	A1
1920	A1
1921	A1
1922	A1
1923	A1
1924	A1
1925	A1
1926	A1
2261	A1
3250	A1
3259	A1
3263	B1
3269	B1
5250	A1
6255	B1
6259	B1
9002	A1
9003	B1
9005	A1
9006	A1
9007	B1
9008	B1
9009	B1
9010	A1


1
A
B
6257
6256
6258
4201
5251
2260
6250
2251
3255
2252
3256
2266
2254
6254
3251
3252
3258
2253
5255
4207
3270
2255
2250
2265
7250
3273
2267
3272
2257
3260
3262
4001
3271
5254
3254
3253
5253
3257
5257
3261
3268
2262
3264
2258
2259

2250	A1
2251	A1
2252	A1
2253	A1
2254	A1
2255	A1
2256	A1
2257	A1
2258	B1
2259	B1
2260	A1
2262	B1
2265	A1
2266	A1
2267	A1
3251	A1
3252	A1
3253	B1
3254	B1
3255	A1
3256	A1
3257	B1
3258	A1
3260	A1
3261	B1
3262	A1
3264	B1
3268	B1
3270	A1
3271	B1
3272	A1
3273	A1
4001	A1
4201	A1
4207	A1
5251	A1
5253	B1
5254	B1
5255	A1
5257	B1
6250	A1
6254	A1
6256	A1
6257	A1
6258	A1
7250	A1

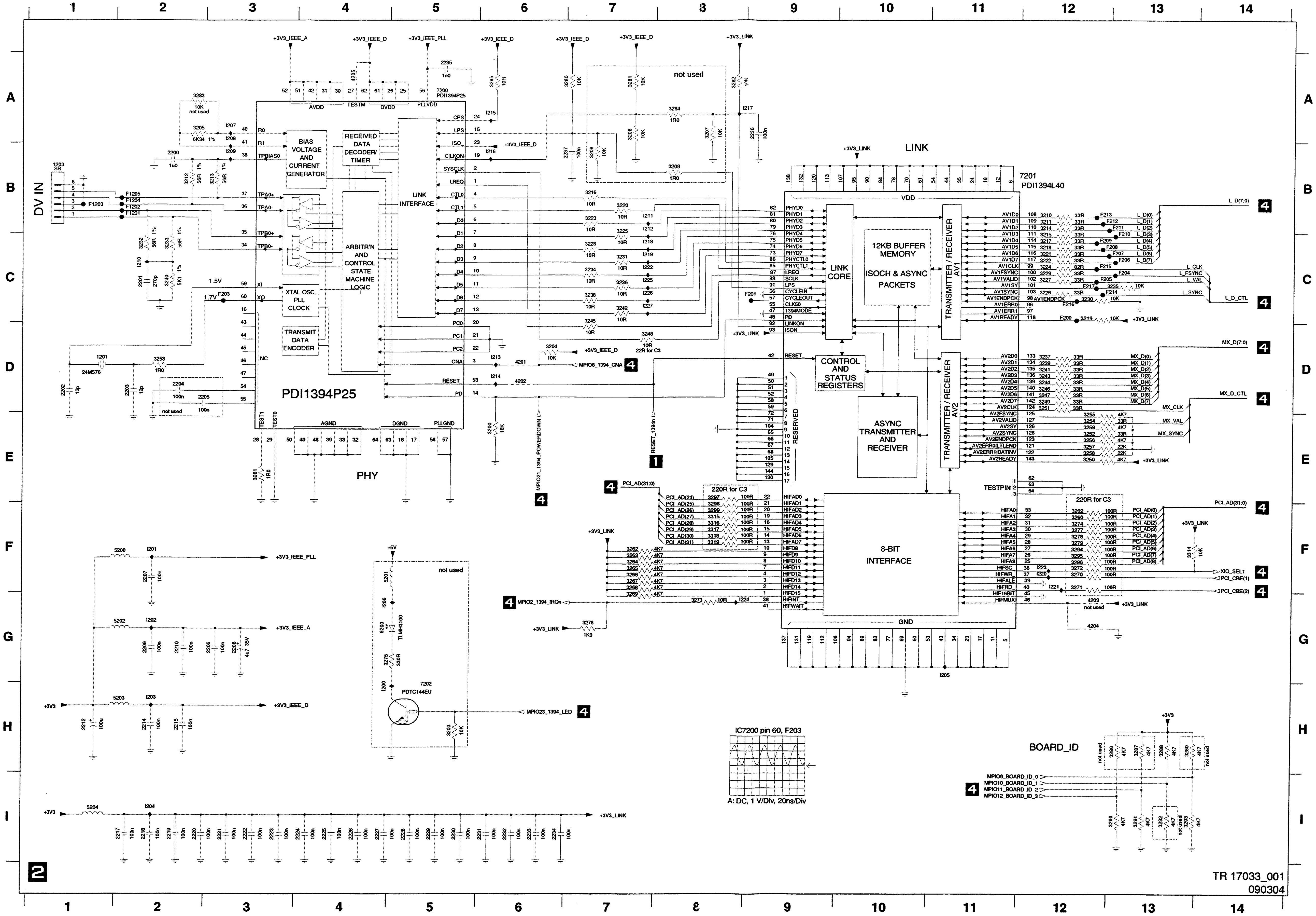
TR 06037_001
060203

Digital Board Chrysalis F: IDE, UARTS, RESET, BE


1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
7106
NCP303LSN29
RESETn
6100
1PS76SB10
6101
1PS76SB10
EJTAG_RESETn
IRESET_DIG
PNX7100_RESETn
XIO_SEL_NANDFLASH
XIO_SEL0
XIO_SEL_NORFLASH
BE_DATA
BE_BCLK
VDD_PNX_PAD
7103
74LVC1G32GW
MPIO6_BE_DLOAD
for AV2 only
BE_DATA_WR
BE_SYNC
BE_FLAG
BE_DATA_RD
BE_WCLK
BE_V4
1100
FMN-BMT
for AV2 or DTTV only
UART2
TXD2
RXD2
RTS2
MPIO1_BE_IRQn
CTS2
1105
FMN-BMT
BE_FAN
RESET_BEn
MPIO6_BE_DLOAD
PNX7100_SYS_RESETn
+3V3_RES
5100
7104-3
74LVC08AD
MPIO13_IDE1_RESETn
RESET_IDE1n
7104-4
74LVC08AD
MPIO14_IEEE1394_RESETn
RESET_1394n
7107-1
74LVC08AD
MPIO15_BE_RESETn
RESET_BEn
7107-2
74LVC08AD
MPIO16_PROGSCAN_RESETn
RESET_PROGSCANn
7107-3
74LVC08AD
MPIO31_SERVICE_MODE_FAST
ANALOG_RESETn
7104-1
74LVC08AD
MPIO20_FURORE_RESETn
VIP_RESETn
7104-2
74LVC08AD
MPIO18_IDE2_RESETn
RESET_IDE2n
RXD3
TXD3
CTS3
RTS3
7100
PDTC124EU
7101
PDTC124EU
7102
PDTC124EU
7105
PDTC124EU
not for UART 3V3 or I2C
for UART 3V3 only
MPIO4
MPIO1_BE_IRQn
ANALOG_RESETn
IRESET_DIG
1104
ANALOG BOARD
FMN-BMT
ION
ANA_WE
BE_FAN
SCL0
SDA0
+3V3_RES
7107-4
74LVC08AD
MPIO17_ANA_WE_LV
+5V_SERV
7111-5
74HCT14D
7111-6
74HCT14D
1106
SD-71308
not used
TXD1
RXD1
VIP_FB
RESET_IDE1n
IDE1_DD(15:0)
IDE1_DD(7)
IDE1_DD(8)
IDE1_DD(6)
IDE1_DD(9)
IDE1_DD(5)
IDE1_DD(10)
IDE1_DD(4)
IDE1_DD(11)
IDE1_DD(3)
IDE1_DD(12)
IDE1_DD(2)
IDE1_DD(13)
IDE1_DD(1)
IDE1_DD(14)
IDE1_DD(0)
IDE1_DD(15)
IDE1
1102
1-440090-4
IDE1_CTL
IDE1_DMARQ
IDE1_IORDY
IDE1_IRQ
TLMH3100
7108
74LVC245APW
MPIO22_PCI_RESETn
IDE1_DIOWn
IDE1_DIORn
IDE1_DMACKn
IDE1_DA1
IDE1_DA0
IDE1_DA2
IDE1_CS0n
IDE1_CS1n
ONLY FOR IDE1
7111-1
74HCT14D
7111-3
74HCT14D
7111-2
74HCT14D
7111-4
74HCT14D
TXD0
RXD0
RTS0
CTS0
UART0
MPIO19_CTL_SERVICE
1103
B7B-PH-SM3
Service
TR 17032_001
090304

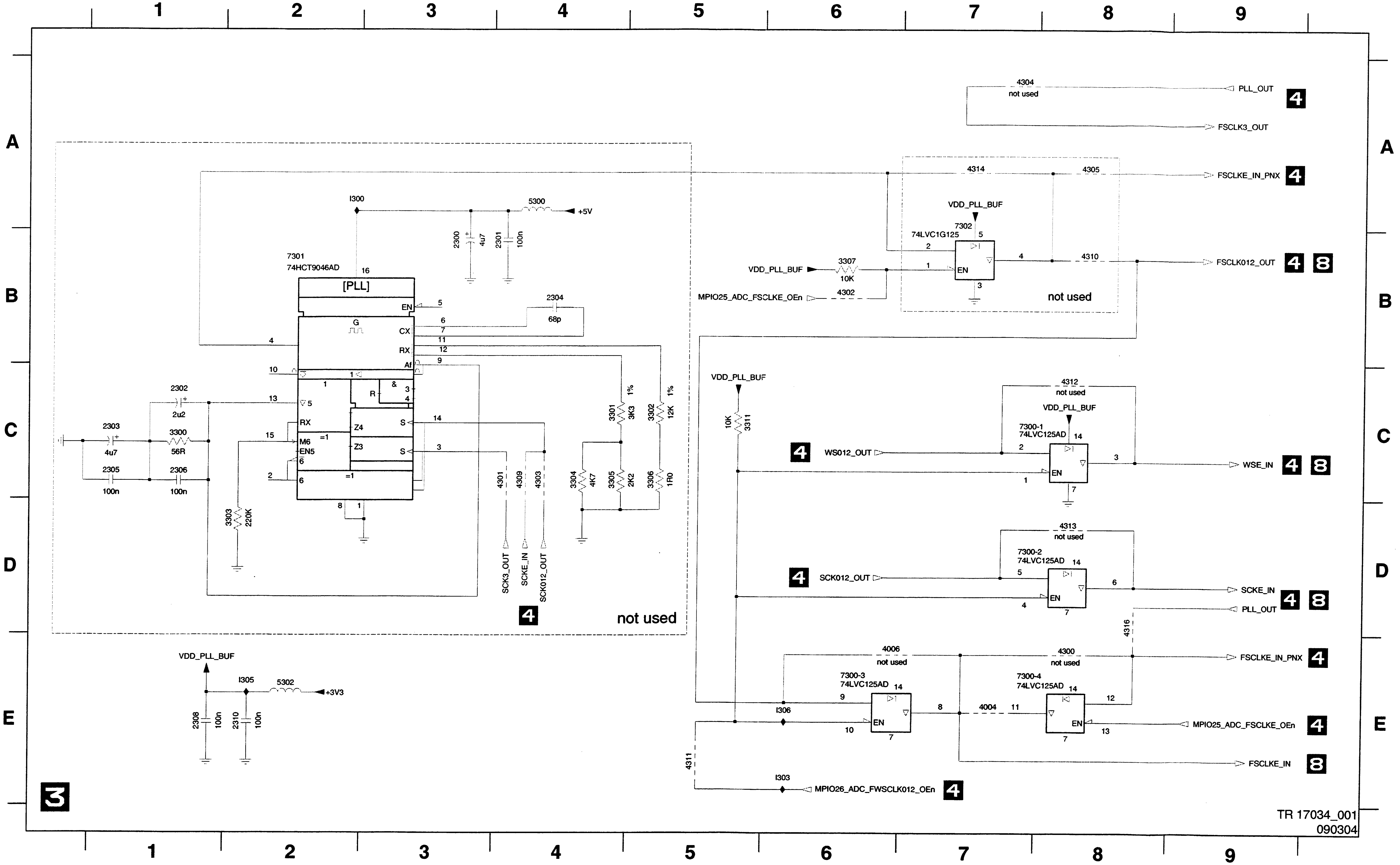
Item	Location
U1	H9
1100	A10
1102	B14
1103	H14
1104	G9
1105	C10
1106	I5
2100	A8
2101	B1
2102	E7
2103	C3
2104	E8
2105	E8
2106	E8
2107	E8
2108	A7
2109	E9
2110	E9
2111	E9
2112	H13
2113	C11
2114	A2
2115	E12
2116	E11
2117	D3
2118	I3
2119	I12
2120	I8
2124	I5
2125	C4
3003	G6
3039	E11
3080	G7
3081	H7
3082	G10
3085	C6
3086	C6
3088	I6
3090	F2
3091	G2
3092	I11
3093	I12
3094	D7
3095	C2
3096	H5
3097	I8
3098	I7
3099	I8
3100	A12
3101	A12
3102	B8
3103	A12
3104	B7
3105	B8
3106	A12
3107	B9
3108	A12
3109	B8
3110	A12
3111	B8
3112	A12
3113	A3
3114	A2
3115	C8
3116	A12
3117	H2
3118	B12
3119	I2
3120	B12
3121	A9
3122	B12
3123	E6
3124	B12
3125	E7
3126	B12
3127	F5
3128	B12
3129	F6
3130	B12
3131	C7
3132	F7
3133	C12
3134	G5
3135	C12
3136	C7
3137	F6
3138	C12
3139	C7
3140	C7
3141	D7
3142	G8
3143	C12
3144	E5
3145	C12
3147	E13
3149	E13
3150	I6
3152	D7
3154	C12
3156	D12
3157	D7
3159	E13
3160	I2
3161	D12
3162	D2
3163	C2
3164	D12
3165	C2
3166	I2
3167	E13
3168	D12
3170	E13
3172	E13
3173	E2
3175	E14
3178	E14
3180	D12
3184	F2
3185	G12
3186	G13
3187	F2
3189	H12
3191	H11
3192	H12
3195	I10
3197	I12
3199	I12
4110	F8
4111	G7
4112	D11
4113	F9
4115	D2
4116	I2
4117	A2
4118	F5
4119	F8
4120	F8
4122	A4
4123	A4
4124	A8
4125	H7
5100	C4
5102	D11
5103	I13
5104	H8
6100	A2
6101	A2
6103	D11
7100	E5
7101	E6
7102	F5
7103	A8
7104-1	H2
7104-2	I2
7104-3	D2
7104-4	D2
7105	F6
7106	A1
7107-1	E2
7107-2	F2
7107-3	G2
7107-4	H6
7108	E12
7111-1	G11
7111-2	I11
7111-3	H11
7111-4	I11
7111-5	I6
7111-6	I7
F0001	B9
F0003	B9
F0005	B9
F0007	B9
F0009	B9
F0011	B9
F0015	A10
F0201	A13
F0202	B14
F0203	A13
F0204	A13
F0205	A13
F0206	A13
F0207	A13
F0208	A13
F0209	B13
F0210	B13
F0211	B13
F0212	B13
F0213	B13
F0214	B13
F0215	B13
F0216	C13
F0217	C13
F0218	C13
F0221	C13
F0223	C14
F0225	C14
F0227	C14
F0229	D14
F0231	D14
F0233	D14
F0234	D13
F0235	E13
F0236	E13
F0237	E14
F0238	E14
F0239	D13
F0301	H13
F0302	H13
F0303	H13
F0304	H13
F0305	H13
F0306	H13
F0307	I13
F0401	H9
F0403	G9
F0404	G9
F0405	G9
F0406	G9
F0407	G9
F0408	G9
F0409	F9
F0410	F9
F0501	D10
F0503	D9
F0506	D9
F0508	C9
F0509	D9
F0510	C9
F0511	C9
F0512	C9
F0514	C9
F0601	I5
F0603	I5
F936	G3
I100	A2
I102	A3
I105	A4
I106	B4
I108	D3
I109	E3
I110	E3
I111	F3
I112	C3
I114	C2
I116	D11
I117	H7
I119	D2
I120	E2
I121	E2
I122	F2
I123	H2
I124	G2
I125	I2

Digital Board Chrysalis F: 1394


DV IN
PDI1394P25
PHY
BIAS VOLTAGE AND CURRENT GENERATOR
RECEIVED DATA DECODER/ TIMER
LINK INTERFACE
ARBITR'N AND CONTROL STATE MACHINE LOGIC
XTAL OSC. PLL CLOCK
TRANSMIT DATA ENCODER
7200 PDI1394P25
not used
LINK
7201 PDI1394L40
VDD
LINK CORE
12KB BUFFER MEMORY
ISOCH & ASYNC PACKETS
TRANSMITTER / RECEIVER AV1
CONTROL AND STATUS REGISTERS
ASYNC TRANSMITTER AND RECEIVER
TRANSMITTER / RECEIVER AV2
RESERVED
8-BIT INTERFACE
GND
TESTPIN
220R for C3
L_D(7:0)
L_CLK
L_FSYNC
L_VAL
L_SYNC
L_D_CTL
MX_D(7:0)
MX_CLK
MX_VAL
MX_SYNC
MX_D_CTL
PCI_AD(31:0)
XIO_SEL1
PCI_CBE(1)
PCI_CBE(2)
MPIO8_1394_CNA
MPIO21_1394_POWERDOWN
RESET_1394n
MPIO2_1394_IRQn
MPIO23_1394_LED
7202 PDTC144EU
IC7200 pin 60, F203
A: DC, 1 V/Div, 20ns/Div
BOARD_ID
MPIO9_BOARD_ID_0
MPIO10_BOARD_ID_1
MPIO11_BOARD_ID_2
MPIO12_BOARD_ID_3
+3V3_IEEE_A
+3V3_IEEE_D
+3V3_IEEE_PLL
+3V3_LINK
+3V3
+5V
2
TR 17033_001
090304

1201 D1
1203 B1
2200 B2
2201 C2
2202 D1
2203 D2
2204 D2
2205 D2
2206 G3
2207 F2
2208 G3
2209 G2
2210 G2
2212 H1
2214 H2
2215 H2
2217 I2
2218 I2
2219 I2
2220 I2
2221 I3
2222 I3
2223 I3
2224 I4
2225 I4
2226 I4
2227 I4
2228 I5
2229 I5
2230 I5
2231 I6
2232 I6
2233 I6
2234 I6
2235 A5
2236 A9
2237 B6
3200 E6
3202 F12
3203 H5
3204 D6
3205 A2
3206 A7
3207 A8
3208 B7
3209 B8
3210 B12
3211 B12
3212 B2
3213 B3
3214 B12
3215 C12
3216 B7
3217 C12
3218 C12
3219 C12
3220 B7
3221 C12
3222 C12
3223 B7
3224 C12
3225 C7
3226 C12
3227 C12
3228 C7
3229 C12
3230 C12
3231 C7
3232 C2
3233 C2
3234 C7
3235 C13
3236 C7
3237 D12
3238 C7
3239 D12
3240 C2
3241 D12
3242 C7
3243 D12
3244 D12
3245 D7
3246 D12
3247 D12
3248 D7
3249 D12
3250 E12
3251 D12
3252 E12
3253 D2
3254 E12
3255 E12
3256 E12
3257 E12
3258 E12
3259 E12
3260 F12
3261 E3
3262 F7
3263 F7
3264 F7
3265 F7
3266 F7
3267 F7
3268 F7
3269 G7
3270 F12
3271 F12
3272 F12
3273 G8
3274 F12
3275 G5
3276 G7
3277 F12
3278 F12
3279 F12
3280 A7
3281 A7
3282 A8
3283 A2
3284 A8
3285 A6
3286 H13
3287 H13
3288 H13
3289 H13
3290 I13
3291 I13
3292 I13
3293 I13
3294 F12
3295 F12
3296 F12
3297 E8
3298 F8
3299 F8
3314 F13
3315 F8
3316 F8
3317 F8
3318 F8
3319 F8
4201 D6
4202 D6
4203 G12
4204 G12
4205 A4
5200 F2
5201 F4
5202 G2
5203 H2
5204 I1
6200 G4
7200 A5
7201 A11
7202 H5
F1201 B2
F1202 B2
F1203 B1
F1204 B2
F1205 B2
F200 C12
F201 C9
F203 C3
F204 C13
F205 C12
F206 C13
F207 C13
F208 C12
F209 C12
F210 C13
F211 B13
F212 B12
F213 B12
F214 C12
F215 C12
F216 C12
F217 C12
I200 H4
I201 F2
I202 G2
I203 H2
I204 I2
I205 G11
I206 G4
I207 A3
I208 A3
I209 B3
I210 C2
I211 B7
I212 B7
I213 D6
I214 D6
I215 A6
I216 B6
I217 A8
I218 C7
I219 C7
I220 F12
I221 F12
I222 C7
I223 F12
I224 G8
I225 C7
I226 C7
I227 C7

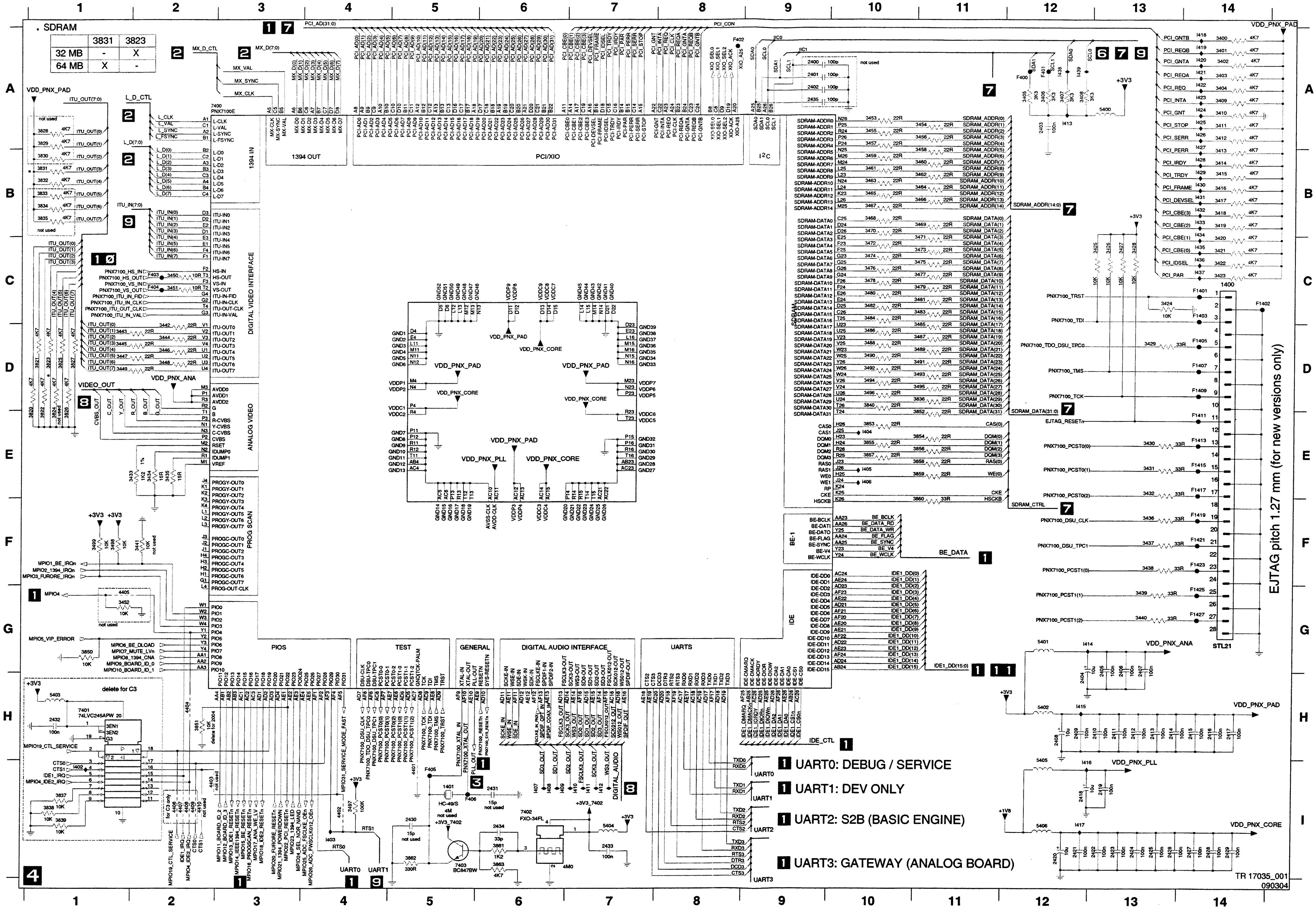
Digital Board Chrysalis F: Audio PLL



1 2 3 4 5 6 7 8 9
A B C D E
4304
not used
PLL_OUT
FSCLK3_OUT
4314
4305
FSCLKE_IN_PNX
VDD_PLL_BUF
7302
74LVC1G125
EN
4310
FSCLK012_OUT
3307
10K
VDD_PLL_BUF
4302
MPIO25_ADC_FSCLKE_OEn
not used
I300
5300
+5V
2300
4u7
2301
100n
7301
74HCT9046AD
[PLL]
EN
CX
RX
Af
2304
68p
2302
2u2
2303
4u7
3300
56R
2305
100n
2306
100n
RX
M6
EN5
Z4
Z3
R
3303
220K
3301
3K3
1%
3302
12K
1%
3304
4K7
3305
2K2
3306
1R0
4301
4309
4303
SCK3_OUT
SCKE_IN
SCK012_OUT
not used
VDD_PLL_BUF
3311
10K
4312
not used
7300-1
74LVC125AD
WS012_OUT
WSE_IN
4313
not used
7300-2
74LVC125AD
SCK012_OUT
SCKE_IN
PLL_OUT
4316
4006
not used
4300
not used
FSCLKE_IN_PNX
7300-3
74LVC125AD
7300-4
74LVC125AD
4004
I306
MPIO25_ADC_FSCLKE_OEn
FSCLKE_IN
4311
I303
MPIO26_ADC_FWSCLK012_OEn
VDD_PLL_BUF
I305
5302
+3V3
2308
100n
2310
100n
3
4
8
TR 17034_001
090304

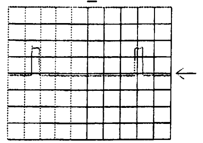
2300	B3
2301	B4
2302	C1
2303	C1
2304	B4
2305	C1
2306	C1
2308	E1
2310	E2
3300	C1
3301	C4
3302	C5
3303	D2
3304	C4
3305	C4
3306	C5
3307	B6
3311	C5
4004	E7
4006	E6
4300	E8
4301	C4
4302	B6
4303	C4
4304	A7
4305	A8
4309	C4
4310	B8
4311	E5
4312	C8
4313	D8
4314	A7
4316	D8
5300	A4
5302	E2
7300-1	C7
7300-2	D7
7300-3	E6
7300-4	E7
7301	B2
7302	A7
I300	A2
I303	E6
I305	E2
I306	E6

Digital Board Chrysalis F: Chrysalis


SDRAM
3831 3823
32 MB - X
64 MB X -
VDD_PNX_PAD
ITU_OUT(7:0)
L_D_CTL
MX_D_CTL
MX_D(7:0)
PCI_AD(31:0)
PCI_CON
7400
PNX7100E
1394 IN
1394 OUT
PCI/XIO
I2C
DIGITAL VIDEO INTERFACE
ANALOG VIDEO
PROG SCAN
VIDEO_OUT
VDD_PNX_ANA
VDD_PNX_CORE
VDD_PNX_PLL
SDRAM
SDRAM_ADDR(14:0)
SDRAM_DATA(31:0)
SDRAM_CTRL
BE-1
BE_DATA
IDE
IDE1_DD(15:0)
IDE_CTL
PIOS
TEST
GENERAL
DIGITAL AUDIO INTERFACE
DIGITAL_AUDIO
UARTS
UART0: DEBUG / SERVICE
UART1: DEV ONLY
UART2: S2B (BASIC ENGINE)
UART3: GATEWAY (ANALOG BOARD)
delete for C3
7401
74LVC245APW
7402
FXO-34FL
7403
BC847BW
1401
HC-49/S
4M
1400
STL21
EJTAG pitch 1.27 mm (for new versions only)
+3V3
+1V8
TR 17035_001
090304
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I

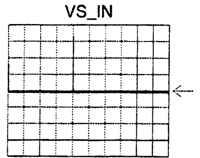
1400	C14
1401	I5
2400	A9
2401	A9
2402	A9
2403	A12
2404	H12
2405	G13
2406	G13
2407	G13
2408	H12
2409	H12
2410	H13
2411	H13
2412	H13
2413	H13
2414	H13
2415	H14
2416	H14
2417	H14
2418	I12
2419	I13
2420	I12
2421	I12
2422	I13
2423	I13
2424	I13
2425	I13
2426	I13
2427	I14
2428	I14
2429	I14
2430	I5
2431	I6
2432	H1
2433	I7
2434	I6
2435	A9
3400	A14
3401	A14
3402	A14
3403	A14
3404	A14
3405	A12
3406	A12
3407	A12
3408	A12
3409	A14
3410	A14
3411	A14
3412	A14
3413	B14
3414	B14
3415	B14
3416	B14
3417	B14
3418	B14
3419	B14
3420	C14
3421	C14
3422	C14
3423	C14
3424	C13
3425	C13
3426	C13
3427	C13
3428	C13
3429	D13
3430	E13
3431	E13
3432	E13
3433	E2
3434	E2
3435	E2
3436	F13
3437	F13
3438	F13
3439	G13
3440	G13
3441	F2
3442	D2
3443	D1
3444	D2
3445	D1
3446	D2
3447	D1
3448	D2
3449	D1
3450	C2
3451	C2
3452	G1
3453	A10
3454	A11
3455	A10
3456	A11
3457	A10
3458	B11
3459	B10
3460	B11
3461	B10
3462	B11
3463	B10
3464	B11
3465	B10
3466	B11
3467	B10
3468	B10
3469	B11
3470	B10
3471	C11
3472	C10
3473	C11
3474	C10
3475	C11
3476	C10
3477	C11
3478	C10
3479	C11
3480	C10
3481	C11
3482	C10
3483	C11
3484	C10
3485	D11
3486	D10
3487	D11
3488	D10
3489	D11
3490	D10
3491	D11
3492	D10
3493	D11
3494	D10
3495	D11
3496	D10
3497	I4
3498	F1
3499	F1
3820	D1
3821	D1
3822	D1
3823	D1
3824	D1
3825	D1
3826	D1
3827	D1
3828	A1
3829	A1
3830	B1
3831	B1
3832	B1
3833	B1
3834	B1
3835	B1
3836	D11
3837	I1
3838	I1
3839	I1
3840	D10
3850	G1
3851	H2
3852	E11
3853	E10
3854	E11
3855	E10
3856	E11
3857	E10
3858	E11
3859	E11
3860	F11
3861	I6
3862	I5
3863	I6
4401	I5
4402	I4
4403	I2
4404	H2
4405	G1
4406	I2
4407	I2
4408	I2
4409	I2
4410	I2
5400	A13
5401	G12
5402	H12
5403	H1
5404	I7
5405	I12
5406	I12
7400	A2
7401	H1
7402	I6
7403	I5
F1401	C14
F1402	C14
F1403	C14
F1405	D14
F1407	D14
F1409	D14
F1411	E14
F1413	E14
F1415	E14
F1417	E14
F1419	F14
F1421	F14
F1423	F14
F1425	G14
F1427	G14
F400	A12
F401	A12
F402	A8
F403	C2
F404	C2
F405	I5
F406	I5
I402	I1
I403	I4
I404	E10
I405	E10
I406	E10
I407	I6
I408	I6
I409	I6
I410	I7
I411	I7
I412	I7
I413	A12
I414	G12
I415	H12
I416	I12
I417	I12
I418	A14
I419	A14
I420	A14
I421	A14
I422	A14
I423	A14
I424	A14
I425	A14
I426	A14
I427	A14
I428	B14
I429	B14
I430	B14
I431	B14
I432	B14
I433	B14
I434	B14
I435	C14
I436	C14
I437	C14
I438	A12
I439	A12

HS_IN



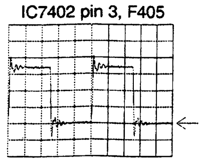
A: DC, 2 V/Div, 10us/Div

VS_IN



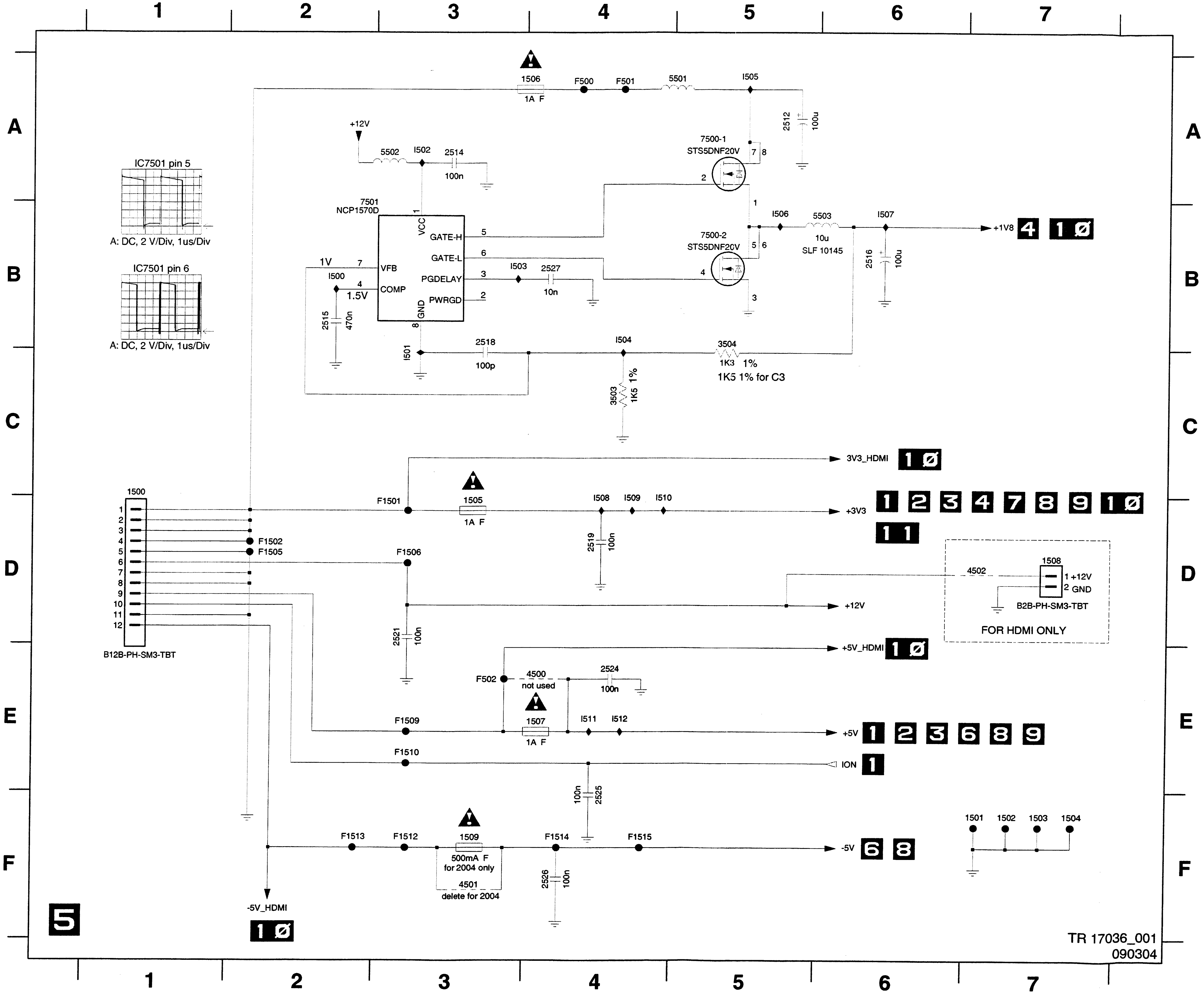
A: DC, 1 V/Div, 5ms/Div

IC7402 pin 3, F405



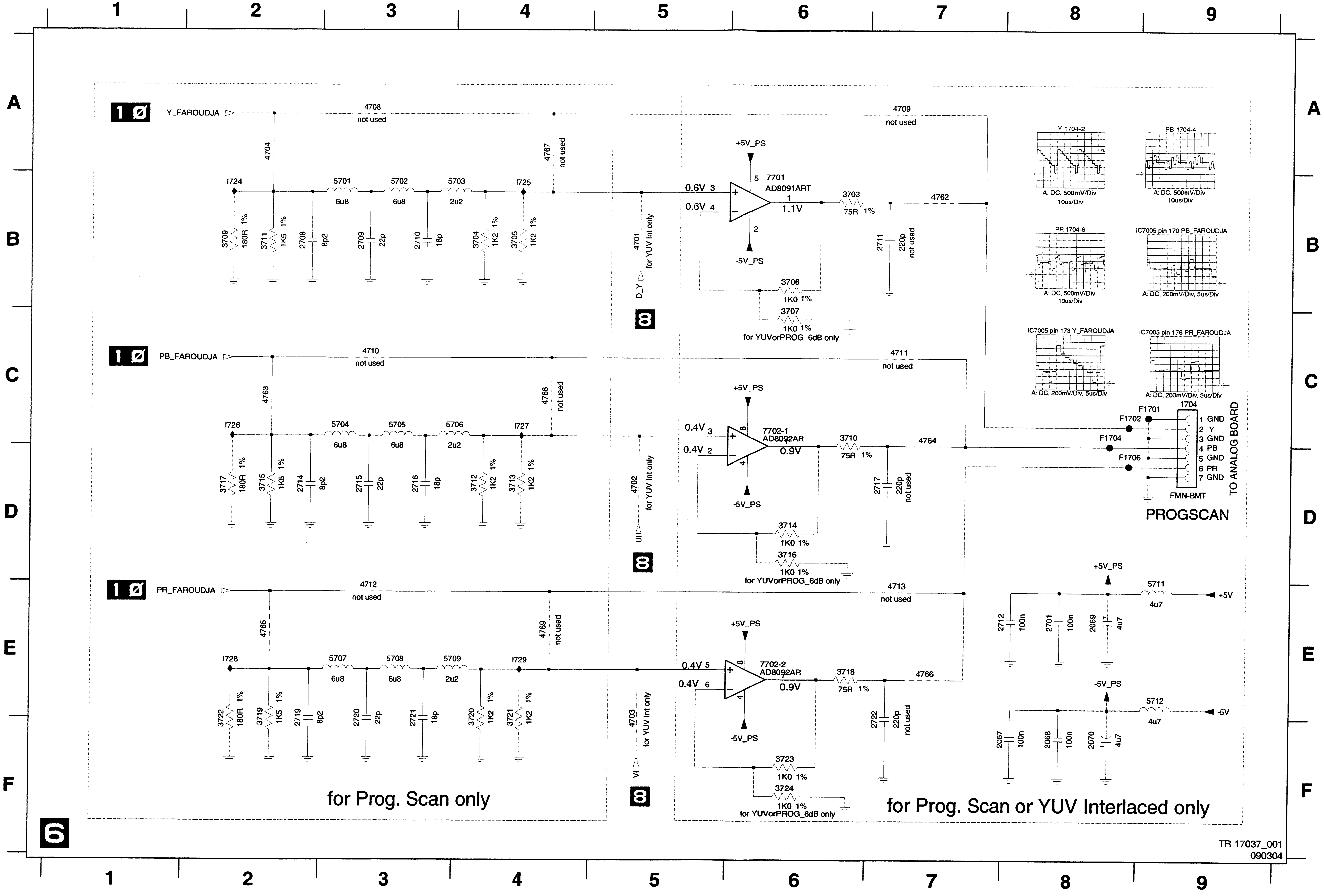
A: DC, 1 V/Div, 50ns/Div

Digital Board Chrysalis F: 1.8V Power


1
2
3
4
5
6
7
A
B
C
D
E
F
1506
1A F
F500
F501
5501
1505
2512
100u
+12V
5502
I502
2514
100n
7500-1
STS5DNF20V
7
8
2
1
IC7501 pin 5
A: DC, 2 V/Div, 1us/Div
IC7501 pin 6
A: DC, 2 V/Div, 1us/Div
7501
NCP1570D
VCC
GATE-H
GATE-L
VFB
COMP
PGDELAY
PWRGD
GND
1V
I500
1.5V
2515
470n
5
6
3
2
4
8
I503
2527
10n
7500-2
STS5DNF20V
5
6
4
3
I506
5503
10u
SLF 10145
I507
+1V8
4
1 0
2516
100u
I501
2518
100p
I504
3504
1K3 1%
1K5 1% for C3
3503
1K5 1%
3V3_HDMI
1 0
1500
F1501
1505
1A F
I508
I509
I510
+3V3
1
2
3
4
7
8
9
1 0
1 1
2519
100n
1
2
3
4
5
6
7
8
9
10
11
12
F1502
F1505
F1506
B12B-PH-SM3-TBT
4502
1508
1 +12V
2 GND
B2B-PH-SM3-TBT
FOR HDMI ONLY
+12V
2521
100n
+5V_HDMI
1 0
F502
4500
not used
2524
100n
1507
1A F
F1509
I511
I512
+5V
1
2
3
6
8
9
F1510
ION
1
2525
100n
1501
1502
1503
1504
F1513
F1512
1509
500mA F
for 2004 only
4501
delete for 2004
F1514
F1515
-5V
6
8
2526
100n
-5V_HDMI
1 0
5
TR 17036_001
090304

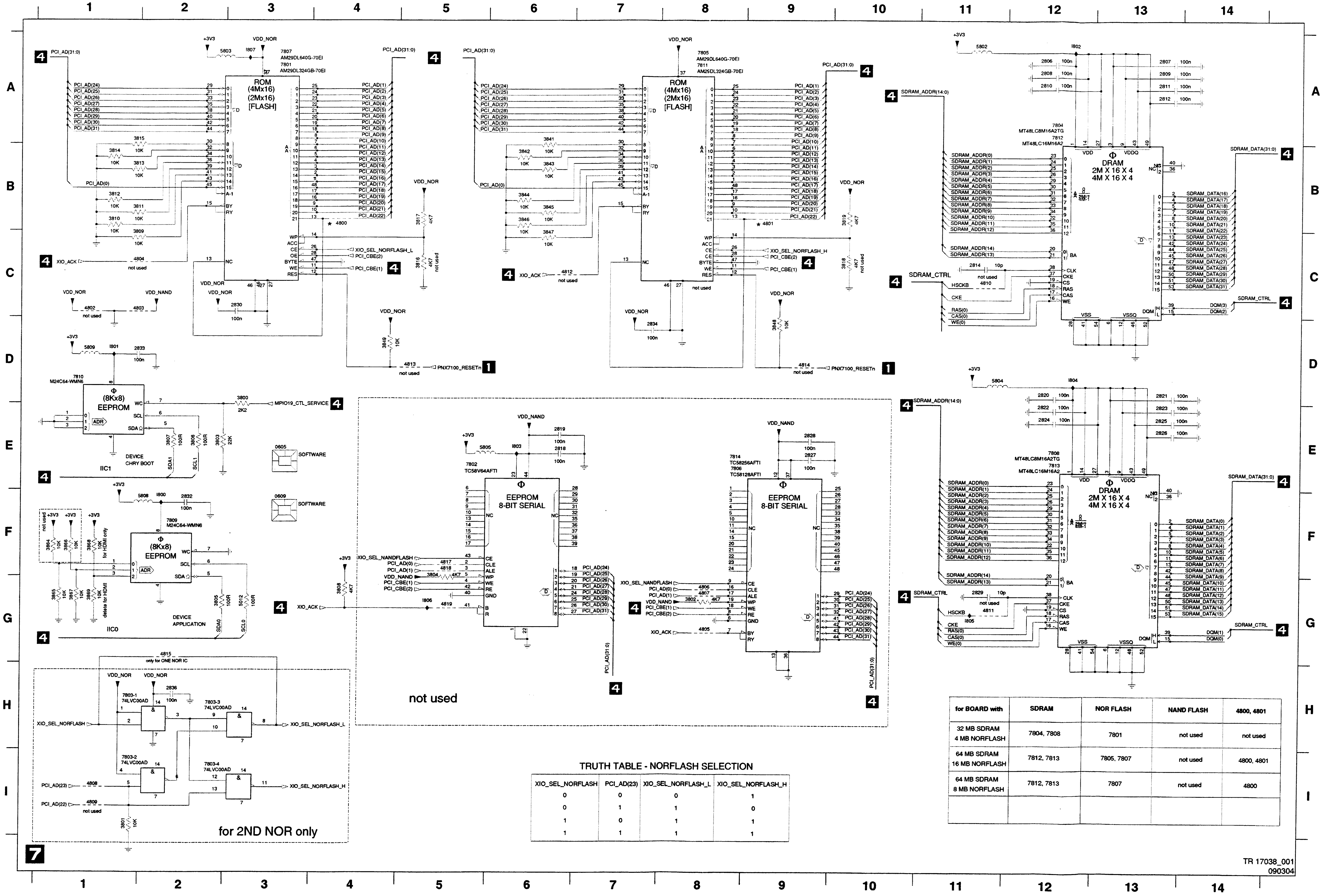
1500	C1
1501	F7
1502	F7
1503	F7
1504	F7
1505	D3
1506	A4
1507	E4
1508	D7
1509	F3
2512	A5
2514	A3
2515	B2
2516	B6
2518	B3
2519	D4
2521	D3
2524	E4
2525	F4
2526	F4
2527	B4
3503	C4
3504	B5
4500	E4
4501	F3
4502	D7
5501	A5
5502	A3
5503	B6
7500-1	A5
7500-2	B5
7501	B3
F1501	D3
F1502	D2
F1505	D2
F1506	D3
F1509	E3
F1510	E3
F1512	F3
F1513	F2
F1514	F4
F1515	F4
F500	A4
F501	A4
F502	E3
I500	B2
I501	C3
I502	A3
I503	B3
I504	B4
I505	A5
I506	B5
I507	B6
I508	D4
I509	D4
I510	D4
I511	E4
I512	E4

Digital Board Chrysalis F: Prog. scan DAC


1 2 3 4 5 6 7 8 9
A B C D E F
1Ø Y_FAROUDJA
4708 not used
4709 not used
4704
4767 not used
I724
5701 6u8
5702 6u8
5703 2u2
I725
3709 180R 1%
3711 1K5 1%
2708 8p2
2709 22p
2710 18p
3704 1K2 1%
3705 1K2 1%
4701 for YUV Int only
D_Y
8
+5V_PS
0.6V 3
0.6V 4
5 7701 AD8091ART
1 1.1V
2
-5V_PS
3703 75R 1%
4762
2711 220p not used
3706 1K0 1%
3707 1K0 1%
for YUVorPROG_6dB only
Y 1704-2
A: DC, 500mV/Div 10us/Div
PB 1704-4
A: DC, 500mV/Div 10us/Div
PR 1704-6
A: DC, 500mV/Div 10us/Div
IC7005 pin 170 PB_FAROUDJA
A: DC, 200mV/Div, 5us/Div
IC7005 pin 173 Y_FAROUDJA
A: DC, 200mV/Div, 5us/Div
IC7005 pin 176 PR_FAROUDJA
A: DC, 200mV/Div, 5us/Div
1Ø PB_FAROUDJA
4710 not used
4711 not used
4763
4768 not used
I726
5704 6u8
5705 6u8
5706 2u2
I727
3717 180R 1%
3715 1K5 1%
2714 8p2
2715 22p
2716 18p
3712 1K2 1%
3713 1K2 1%
4702 for YUV Int only
U
8
+5V_PS
0.4V 3
0.4V 2
8 7702-1 AD8092AR
1 0.9V
4
-5V_PS
3710 75R 1%
4764
2717 220p not used
3714 1K0 1%
3716 1K0 1%
for YUVorPROG_6dB only
F1701
F1702
F1704
F1706
1704
1 GND
2 Y
3 GND
4 PB
5 GND
6 PR
7 GND
FMN-BMT
TO ANALOG BOARD
PROGSCAN
1Ø PR_FAROUDJA
4712 not used
4713 not used
4765
4769 not used
I728
5707 6u8
5708 6u8
5709 2u2
I729
3722 180R 1%
3719 1K5 1%
2719 8p2
2720 22p
2721 18p
3720 1K2 1%
3721 1K2 1%
4703 for YUV Int only
V
8
+5V_PS
0.4V 5
0.4V 6
8 7702-2 AD8092AR
7 0.9V
4
-5V_PS
3718 75R 1%
4766
2722 220p not used
3723 1K0 1%
3724 1K0 1%
for YUVorPROG_6dB only
+5V_PS
5711 4u7
+5V
2712 100n
2701 100n
2069 4u7
-5V_PS
5712 4u7
-5V
2067 100n
2068 100n
2070 4u7
for Prog. Scan only
for Prog. Scan or YUV Interlaced only
6
TR 17037_001
090304

1704	C9
2067	F8
2068	F8
2069	E8
2070	F8
2701	E8
2708	B2
2709	B3
2710	B3
2711	B7
2712	E8
2714	D2
2715	D3
2716	D3
2717	D7
2719	F2
2720	F3
2721	F3
2722	F7
3703	B6
3704	B4
3705	B4
3706	B6
3707	C6
3709	B2
3710	C6
3711	B2
3712	D4
3713	D4
3714	D6
3715	D2
3716	D6
3717	D2
3718	E6
3719	E2
3720	E4
3721	E4
3722	F2
3723	F6
3724	F6
4701	B5
4702	D5
4703	F5
4704	A2
4708	A3
4709	A7
4710	C3
4711	C7
4712	E3
4713	E7
4762	B7
4763	C2
4764	C7
4765	E2
4766	E7
4767	A4
4768	C4
4769	E4
5701	B3
5702	B3
5703	B3
5704	C3
5705	C3
5706	C3
5707	E3
5708	E3
5709	E3
5711	E9
5712	E9
7701	B6
7702-1	C6
7702-2	E6
F1701	C9
F1702	C8
F1704	C8
F1706	D8
I724	B2
I725	B4
I726	C2
I727	C4
I728	E2
I729	E4

Digital Board Chrysalis F: Flash SDRAM EEPROM


ROM (4Mx16) (2Mx16) [FLASH]
7807 AM29DL640G-70EI
7801 AM29DL324GB-70EI
7805 AM29DL640G-70EI
7811 AM29DL324GB-70EI
DRAM 2M X 16 X 4 4M X 16 X 4
7804 MT48LC8M16A2TG
7812 MT48LC16M16A2
7808 MT48LC8M16A2TG
7813 MT48LC16M16A2
EEPROM 8-BIT SERIAL
7802 TC58V64AFTI
7814 TC58256AFTI
7806 TC58128AFTI
(8Kx8) EEPROM
7810 M24C64-WMN6
7809 M24C64-WMN6
DEVICE CHRY BOOT
IIC1
DEVICE APPLICATION
IIC0
SOFTWARE
7803-1 74LVC00AD
7803-2 74LVC00AD
7803-3 74LVC00AD
7803-4 74LVC00AD
XIO_SEL_NORFLASH
XIO_SEL_NORFLASH_L
XIO_SEL_NORFLASH_H
PNX7100_RESETn
MPIO19_CTL_SERVICE
SDRAM_ADDR(14:0)
SDRAM_DATA(31:0)
SDRAM_CTRL
PCI_AD(31:0)
not used
for 2ND NOR only
4815 only for ONE NOR IC
TR 17038_001
090304

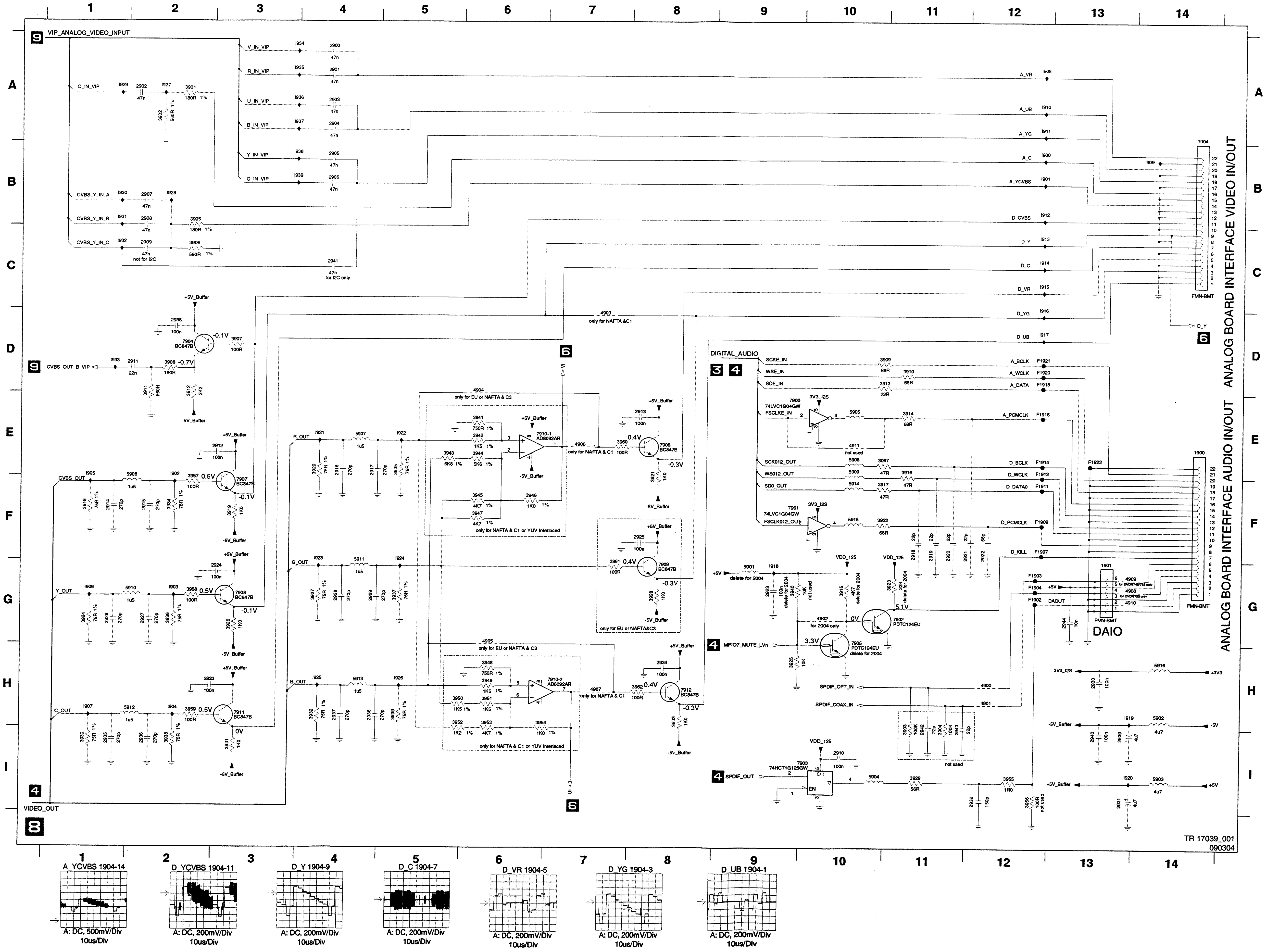
TRUTH TABLE - NORFLASH SELECTION

XIO_SEL_NORFLASH	PCI_AD(23)	XIO_SEL_NORFLASH_L	XIO_SEL_NORFLASH_H
0	0	0	1
0	1	1	0
1	0	1	1
1	1	1	1

for BOARD with	SDRAM	NOR FLASH	NAND FLASH	4800, 4801
32 MB SDRAM 4 MB NORFLASH	7804, 7808	7801	not used	not used
64 MB SDRAM 16 MB NORFLASH	7812, 7813	7805, 7807	not used	4800, 4801
64 MB SDRAM 8 MB NORFLASH	7812, 7813	7807	not used	4800

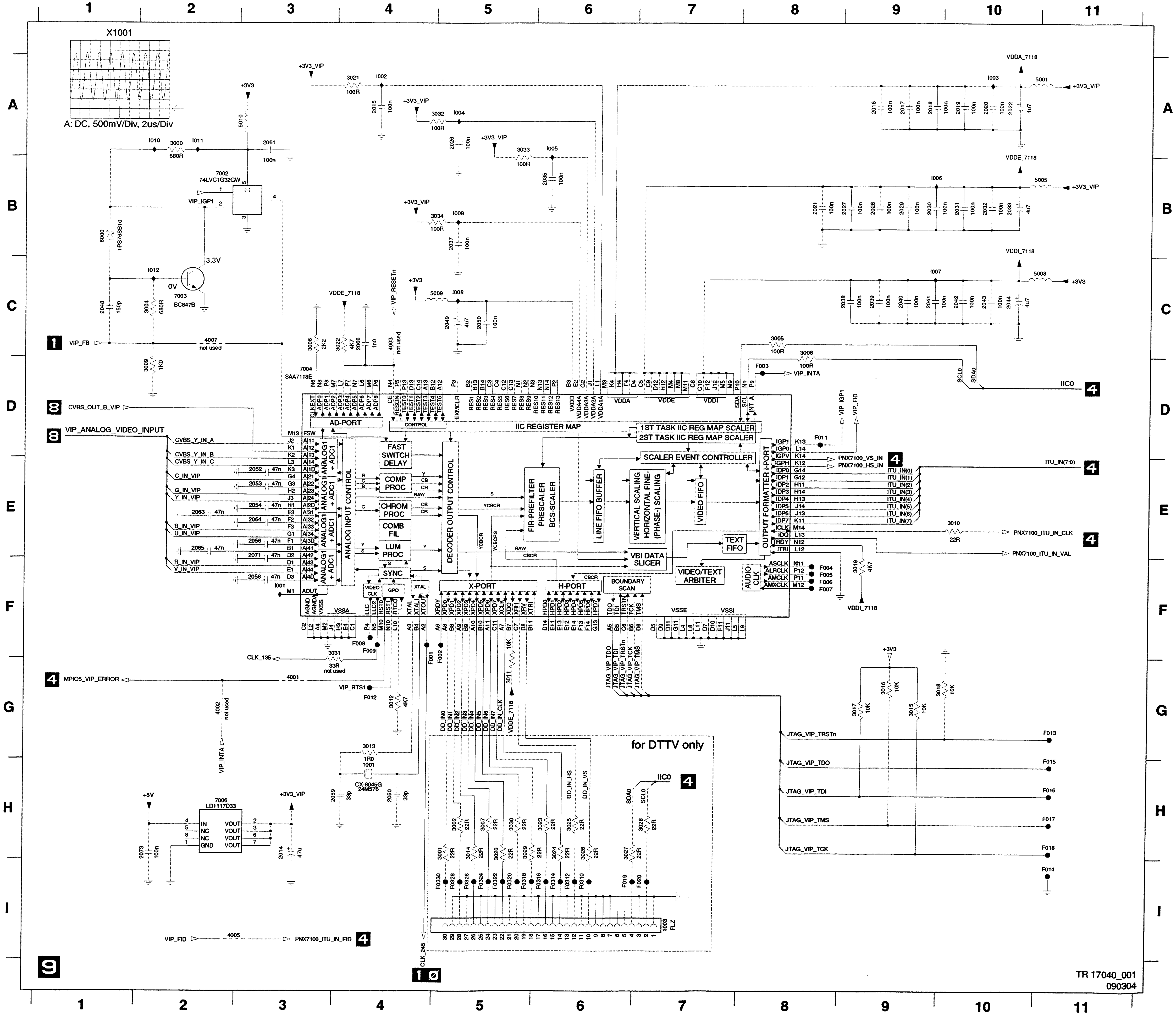
0605	E3
0609	F3
2806	A12
2807	A13
2808	A12
2809	A13
2810	A12
2811	A13
2812	A13
2814	C11
2818	E6
2819	E6
2820	D12
2821	D13
2822	E12
2823	E13
2824	E12
2825	E13
2826	E13
2827	E9
2828	E9
2829	G11
2830	C3
2832	F2
2833	D1
2834	D7
2836	H2
3800	D3
3801	I1
3802	G8
3803	E2
3804	G5
3805	G2
3806	E2
3807	E2
3808	G4
3809	C1
3810	B1
3811	B1
3812	B1
3813	B1
3814	B1
3815	A1
3816	C5
3817	B5
3818	C10
3819	B10
3841	A6
3842	B6
3843	B6
3844	B6
3845	B6
3846	B6
3847	C6
3848	D9
3849	D4
3864	F1
3865	G1
3866	F1
3867	G1
3868	F1
3869	G1
4800	B4
4801	B9
4802	C1
4803	C1
4804	C2
4805	G8
4806	G8
4807	G8
4808	I1
4809	I1
4810	C11
4811	G11
4812	C6
4813	D5
4814	D9
4815	G2
4817	F5
4818	F5
4819	G5
5012	G3
5802	A11
5803	A2
5804	D11
5805	E5
5808	F2
5809	D1
7801	A3
7802	E5
7803-1	H1
7803-2	I1
7803-3	H2
7803-4	I2
7804	A12
7805	A8
7806	E8
7807	A3
7808	E12
7809	F2
7810	D1
7811	A8
7812	A12
7813	E12
7814	E8
I800	F2
I801	D1
I802	A12
I803	E6
I804	D12
I805	G11
I806	G5
I807	A3

Digital Board Chrysalis F: Video IO


VIP_ANALOG_VIDEO_INPUT
V_IN_VIP
R_IN_VIP
C_IN_VIP
U_IN_VIP
B_IN_VIP
Y_IN_VIP
G_IN_VIP
CVBS_Y_IN_A
CVBS_Y_IN_B
CVBS_Y_IN_C
not for I2C
for I2C only
A_VR
A_UB
A_YG
A_C
A_YCVBS
D_CVBS
D_Y
D_C
D_VR
D_YG
D_UB
FMN-BMT
ANALOG BOARD INTERFACE VIDEO IN/OUT
ANALOG BOARD INTERFACE AUDIO IN/OUT
CVBS_OUT_B_VIP
only for NAFTA &C1
only for EU or NAFTA & C3
only for NAFTA & C1 or YUV Interlaced
only for EU or NAFTA&C3
DIGITAL_AUDIO
SCKE_IN
WSE_IN
SDE_IN
FSCLKE_IN
SCK012_OUT
WS012_OUT
SD0_OUT
FSCLK012_OUT
A_BCLK
A_WCLK
A_DATA
A_PCMCLK
D_BCLK
D_WCLK
D_DATA0
D_PCMCLK
D_KILL
DAOUT
DAIO
MPIO7_MUTE_LVn
SPDIF_OPT_IN
SPDIF_COAX_IN
SPDIF_OUT
not used
delete for 2004
for 2004 only
3V3_I2S
+5V_Buffer
-5V_Buffer
VDD_125
CVBS_OUT
Y_OUT
C_OUT
R_OUT
G_OUT
B_OUT
VIDEO_OUT
BC847B
AD8092AR
PDTC124EU
74LVC1G04GW
74HCT1G125GW
TR 17039_001
090304
1 A_YCVBS 1904-14
A: DC, 500mV/Div 10us/Div
2 D_YCVBS 1904-11
A: DC, 200mV/Div 10us/Div
3 D_Y 1904-9
A: DC, 200mV/Div 10us/Div
4 D_C 1904-7
A: DC, 200mV/Div 10us/Div
5 D_VR 1904-5
A: DC, 200mV/Div 10us/Div
6 D_YG 1904-3
A: DC, 200mV/Div 10us/Div
7 D_UB 1904-1
A: DC, 200mV/Div 10us/Div

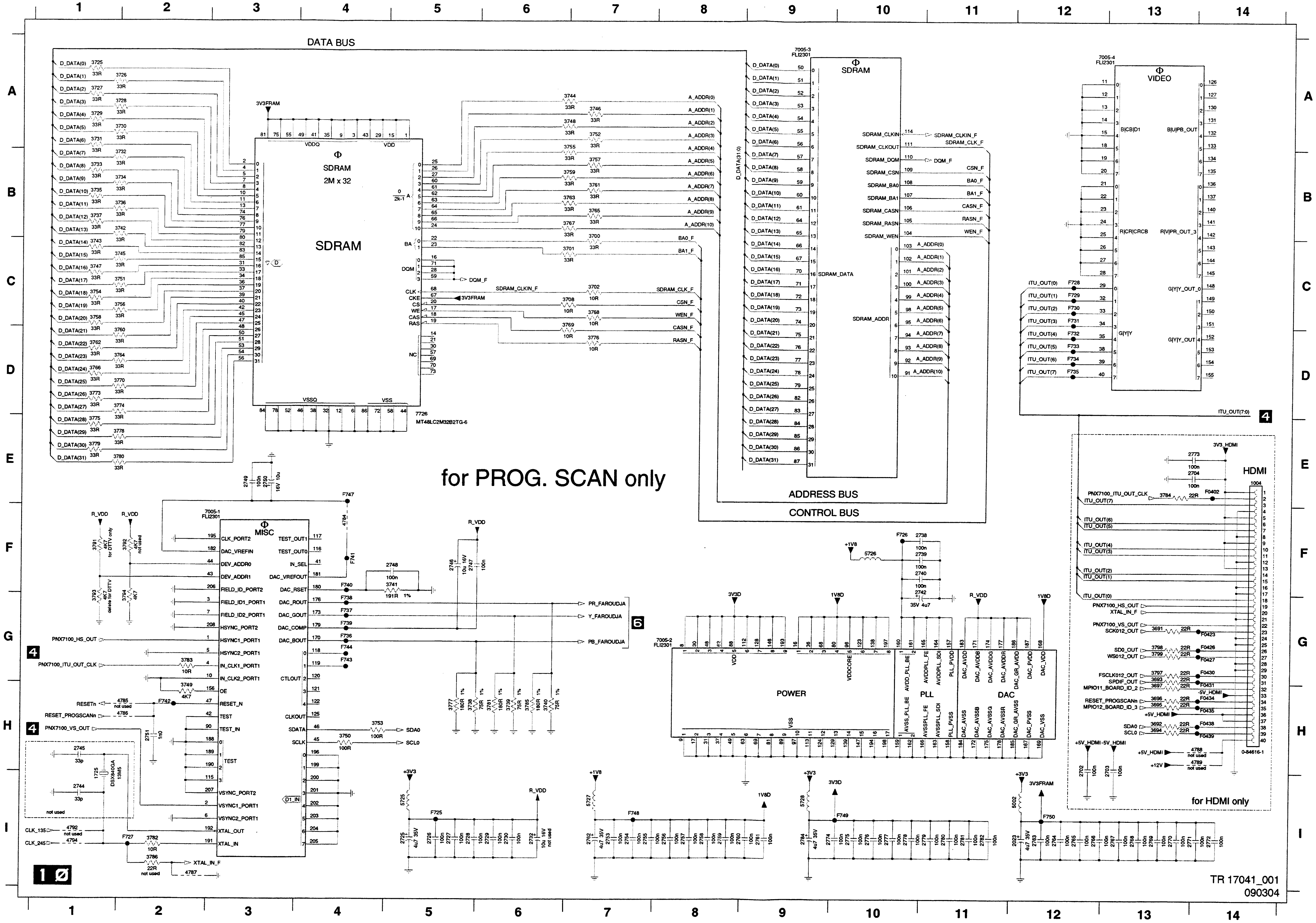
1900	E14
1901	G13
1904	A14
2036	H4
2900	A4
2901	A4
2902	A2
2903	A4
2904	A4
2905	B4
2906	B4
2907	B2
2908	B2
2909	C2
2910	I10
2911	D2
2912	E3
2913	E8
2914	F1
2915	F2
2916	E4
2917	E4
2918	F11
2919	F11
2920	F11
2921	F12
2922	F12
2923	G9
2924	G3
2925	F8
2926	G1
2927	G2
2928	G4
2929	G4
2930	H13
2931	I13
2932	I12
2933	H2
2934	H8
2935	I1
2936	I2
2937	H4
2938	D2
2939	I13
2940	I13
2941	C4
2942	I11
2943	I11
2944	G13
3087	E10
3901	A2
3902	A2
3903	I11
3904	I11
3905	B2
3906	C2
3907	D3
3908	D2
3909	D10
3910	D11
3911	D2
3912	D2
3913	D10
3914	E11
3915	G10
3916	E11
3917	F10
3918	F1
3919	F3
3920	E4
3921	E8
3922	F10
3923	G11
3924	G1
3925	H9
3926	G3
3927	G4
3928	G8
3929	I11
3930	I1
3931	I3
3932	H4
3933	H8
3934	F2
3935	E5
3936	G2
3937	G5
3938	I2
3939	H5
3940	G9
3941	E6
3942	E6
3943	E5
3944	E6
3945	F6
3946	F6
3947	F6
3948	H6
3949	H6
3950	H5
3951	H6
3952	H5
3953	H6
3954	H6
3955	I12
3956	I12
3957	F2
3958	G2
3959	H2
3960	E7
3961	G7
3962	H8
4900	H12
4901	H12
4902	G10
4903	D7
4904	D6
4905	G6
4906	E7
4907	H7
4908	G13
4909	G13
4910	G13
4911	E10
5901	G9
5902	H14
5903	I14
5904	I10
5905	E10
5906	E10
5907	E4
5908	F2
5909	E10
5910	G2
5911	G4
5912	H2
5913	H4
5914	F10
5915	F10
5916	H14
7900	E9
7901	F9
7902	G11
7903	I10
7904	D2
7905	G10
7906	E8
7907	F3
7908	G3
7909	G8
7910-1	E6
7910-2	H7
7911	H3
7912	H8
F1902	G12
F1903	G12
F1904	G12
F1907	F12
F1909	F12
F1911	F12
F1912	E12
F1914	E12
F1916	E12
F1918	D12
F1920	D12
F1921	D12
F1922	E13
I900	B12
I901	B12
I902	E2
I903	G2
I904	H2
I905	E1
I906	G1
I907	H1
I908	A12
I909	B14
I910	A12
I911	A12
I912	B12
I913	C12
I914	C12
I915	C12
I916	C12
I917	D12
I918	G9
I919	H13
I920	I13
I921	E4
I922	E5
I923	F4
I924	F5
I925	H4
I926	H5
I927	A2
I928	B2
I929	A1
I930	B1
I931	B1
I932	C1
I933	D1
I934	A3
I935	A3
I936	A3
I937	A3
I938	B3
I939	B3

Digital Board Chrysalis F: VIPs


X1001
A: DC, 500mV/Div, 2us/Div
7002 74LVC1G32GW
7003 BC847B
7004 SAA7118E
7006 LD1117D33
VIP_FB
CVBS_OUT_B_VIP
VIP_ANALOG_VIDEO_INPUT
MPIO5_VIP_ERROR
CLK_135
VIP_RTS1
VIP_INTA
VIP_FID
PNX7100_ITU_IN_FID
PNX7100_VS_IN
PNX7100_HS_IN
ITU_IN(7:0)
PNX7100_ITU_IN_CLK
PNX7100_ITU_IN_VAL
IIC0
AD-PORT
IIC REGISTER MAP
1ST TASK IIC REG MAP SCALER
2ST TASK IIC REG MAP SCALER
SCALER EVENT CONTROLLER
FAST SWITCH DELAY
COMP PROC
CHROM PROC
COMB FIL
LUM PROC
SYNC
ANALOG INPUT CONTROL
DECODER OUTPUT CONTROL
FIR-PREFILTER PRESCALER BCS-SCALER
LINE FIFO BUFFER
VERTICAL SCALING HORIZONTAL FINE-(PHASE-) SCALING
VIDEO FIFO
OUTPUT FORMATTER I-PORT
TEXT FIFO
VBI DATA SLICER
VIDEO/TEXT ARBITER
AUDIO CLK
X-PORT
H-PORT
BOUNDARY SCAN
JTAG_VIP_TRSTn
JTAG_VIP_TDO
JTAG_VIP_TDI
JTAG_VIP_TMS
JTAG_VIP_TCK
for DTTV only
CX-8045G 24M576
VDDA_7118
VDDE_7118
VDDI_7118
+3V3_VIP
+3V3
+5V
CLK_245
TR 17040_001
090304

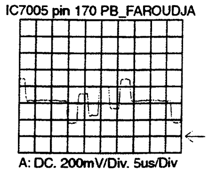
1001 H4	I002 A4
1003 I7	I003 A10
2014 H3	I004 A5
2015 A4	I005 A6
2016 A9	I006 B9
2017 A9	I007 C9
2018 A9	I008 C5
2019 A10	I009 B5
2020 A10	I010 A2
2021 B8	I011 A2
2022 A10	I012 C2
2026 A5	
2027 B9	
2028 B9	
2029 B9	
2030 B9	
2031 B10	
2032 B10	
2033 B10	
2035 B6	
2037 B5	
2038 C9	
2039 C9	
2040 C9	
2041 C9	
2042 C10	
2043 C10	
2044 C10	
2048 C1	
2049 C5	
2050 C5	
2052 E3	
2053 E3	
2054 E3	
2056 E3	
2058 F3	
2059 H4	
2060 H4	
2061 A3	
2063 E2	
2064 E3	
2065 E2	
2066 C4	
2071 F3	
2073 H2	
3000 A2	
3001 H5	
3002 H5	
3004 C2	
3005 C8	
3006 C3	
3007 H5	
3008 C8	
3009 D2	
3010 E10	
3011 G5	
3012 G4	
3013 G4	
3014 H5	
3015 G9	
3016 G9	
3017 G9	
3018 G10	
3019 F9	
3020 H5	
3021 A4	
3022 C4	
3023 H6	
3024 H6	
3025 H6	
3026 H6	
3027 H6	
3028 H7	
3029 H5	
3030 H5	
3031 F3	
3032 A4	
3033 A5	
3034 B4	
4001 G3	
4002 G2	
4003 C4	
4005 I2	
4007 C2	
5001 A10	
5005 B10	
5008 C10	
5009 C4	
5010 A3	
6000 B1	
7002 B2	
7003 C2	
7004 D3	
7006 H2	
F001 F4	
F002 F5	
F003 D8	
F004 F8	
F005 F8	
F006 F8	
F007 F8	
F008 F4	
F009 F4	
F011 D8	
F012 G4	
F013 G11	
F014 I11	
F015 H11	
F016 H11	
F017 H11	
F018 H11	
F019 I6	
F020 I7	
F0310 I6	
F0312 I6	
F0314 I6	
F0316 I6	
F0318 I5	
F0320 I5	
F0322 I5	
F0324 I5	
F0326 I5	
F0328 I5	
F0330 I5	
I001 F3	

Digital Board Chrysalis F: Faroudja


DATA BUS
D_DATA(0) … D_DATA(31)
SDRAM
2M x 32
7726
MT48LC2M32B2TG-6
3V3FRAM
VDDQ
VDD
VSSQ
VSS
BA
DQM
CLK
CKE
CS
WE
CAS
RAS
NC
A_ADDR(0) … A_ADDR(10)
BA0_F
BA1_F
DQM_F
SDRAM_CLKIN_F
SDRAM_CLK_F
CSN_F
WEN_F
CASN_F
RASN_F
7005-3
FLI2301
SDRAM_CLKIN
SDRAM_CLKOUT
SDRAM_DQM
SDRAM_CSN
SDRAM_BA0
SDRAM_BA1
SDRAM_CASN
SDRAM_RASN
SDRAM_WEN
SDRAM_DATA
SDRAM_ADDR
D_DATA(31:0)
ADDRESS BUS
CONTROL BUS
7005-4
FLI2301
VIDEO
B|CB|D1
B|U|PB_OUT
R|CR|CRCB
R|V|PR_OUT_3
G|Y|Y
G|Y|Y_OUT_0
G|Y|Y_OUT
ITU_OUT(0) … ITU_OUT(7)
ITU_OUT(7:0)
4
for PROG. SCAN only
7005-1
FLI2301
MISC
CLK_PORT2
DAC_VREFIN
DEV_ADDR0
DEV_ADDR1
FIELD_ID_PORT2
FIELD_ID1_PORT1
FIELD_ID2_PORT1
HSYNC_PORT2
HSYNC1_PORT1
HSYNC2_PORT1
IN_CLK1_PORT1
IN_CLK2_PORT1
OE
RESET_N
TEST
TEST_IN
VSYNC_PORT2
VSYNC1_PORT1
VSYNC2_PORT1
XTAL_OUT
XTAL_IN
TEST_OUT1
TEST_OUT0
IN_SEL
DAC_VREFOUT
DAC_RSET
DAC_ROUT
DAC_GOUT
DAC_COMP
DAC_BOUT
CTLOUT
CLKOUT
SDATA
SCLK
PR_FAROUDJA
Y_FAROUDJA
PB_FAROUDJA
6
PNX7100_HS_OUT
PNX7100_ITU_OUT_CLK
PNX7100_VS_OUT
RESETn
RESET_PROGSCANn
SDA0
SCL0
CLK_135
CLK_245
XTAL_IN_F
R_VDD
for DTTV only
not used
delete for DTTV
DSX840GA 13M5
not used
7005-2
FLI2301
POWER
PLL
DAC
VDD
VDDCORE
VSS
AVDD_PLL_BE
AVDDPLL_FE
AVDDPLL_SDI
PLL_PVDD
AVSS_PLL_BE
AVSSPLL_FE
AVSSPLL_SDI
PLL_PVSS
DAC_AVDD
DAC_AVDDB
DAC_AVDDG
DAC_AVDDR
DAC_GR_AVDD
DAC_PVDD
DAC_VDD
DAC_AVSS
DAC_AVSSB
DAC_AVSSG
DAC_AVSSR
DAC_GR_AVSS
DAC_PVSS
DAC_VSS
3V3D
1V8D
+1V8
+3V3
3V3FRAM
HDMI
3V3_HDMI
1004
0-84616-1
PNX7100_ITU_OUT_CLK
PNX7100_HS_OUT
XTAL_IN_F
PNX7100_VS_OUT
SCK012_OUT
SD0_OUT
WS012_OUT
FSCLK012_OUT
SPDIF_OUT
MPIO11_BOARD_ID_2
5V_HDMI
RESET_PROGSCANn
MPIO12_BOARD_ID_3
+5V_HDMI
SDA0
SCL0
+5V_HDMI-5V_HDMI
+12V
not used
for HDMI only
1 0
TR 17041_001
090304

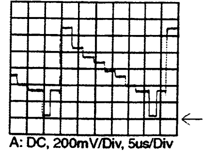
1004	E14
1725	I1
2023	I12
2702	H12
2703	H13
2704	E13
2725	I5
2726	I5
2727	I5
2728	I5
2729	I6
2730	I6
2732	I6
2738	F10
2739	F10
2740	F10
2742	F10
2744	I1
2745	H1
2746	F5
2747	F5
2748	F5
2749	E3
2750	E3
2751	H2
2753	I7
2754	I7
2755	I7
2756	I8
2757	I8
2758	I8
2759	I8
2760	I9
2761	I9
2762	I7
2763	I12
2764	I12
2765	I12
2766	I12
2767	I13
2768	I13
2769	I13
2770	I13
2771	I14
2772	I14
2773	E13
2774	I10
2775	I10
2776	I10
2777	I10
2778	I10
2779	I11
2780	I11
2781	I11
2782	I11
2784	I9
3691	G13
3692	H13
3693	G13
3694	H13
3695	H13
3696	H13
3697	H13
3700	B7
3701	C6
3702	C7
3708	C6
3725	A1
3726	A1
3727	A1
3728	A1
3729	A1
3730	A1
3731	A1
3732	B1
3733	B1
3734	B1
3735	B1
3736	B1
3737	B1
3738	H5
3739	H6
3740	H6
3741	F5
3742	B1
3743	C1
3744	A6
3745	C1
3746	A7
3747	C1
3748	A6
3749	H2
3750	H4
3751	C1
3752	A7
3753	H4
3754	C1
3755	A6
3756	C1
3757	B7
3758	C1
3759	B6
3760	D1
3761	B7
3762	D1
3763	B6
3764	D1
3765	B7
3766	D1
3767	B6
3768	C7
3769	C6
3770	D1
3773	D1
3774	D1
3775	E1
3776	D7
3777	H5
3778	E1
3779	E1
3780	E1
3781	H6
3782	I2
3783	G2
3784	E13
3785	H6
3786	I2
3791	F1
3792	F2
3793	G1
3794	G2
3797	G13
3798	G13
3799	G13
4784	F4
4785	H2
4786	H2
4787	I2
4788	H14
4789	H14
4792	I1
4794	I1
5002	I12
5725	I5
5726	F10
5727	I7
5728	I9
7005-1	F3
7005-2	G8
7005-3	A9
7005-4	A13
7726	E5
F0402	E14
F0423	G14
F0426	G14
F0427	G14
F0430	G14
F0431	G14
F0434	H14
F0435	H14
F0438	H14
F0439	H14
F725	I5
F726	F10
F727	I2
F728	C12
F729	C12
F730	C12
F731	C12
F732	D12
F733	D12
F734	D12
F735	D12
F736	G4
F737	G4
F738	G4
F739	G4
F740	F4
F741	F4
F742	H2
F743	G4
F744	G4
F747	E4
F748	I7
F749	I10
F750	I12

IC7005 pin 170 PB_FAROUDJA



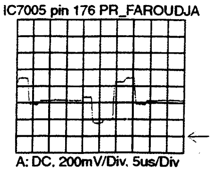
A: DC, 200mV/Div, 5us/Div

IC7005 pin 173 Y_FAROUDJA



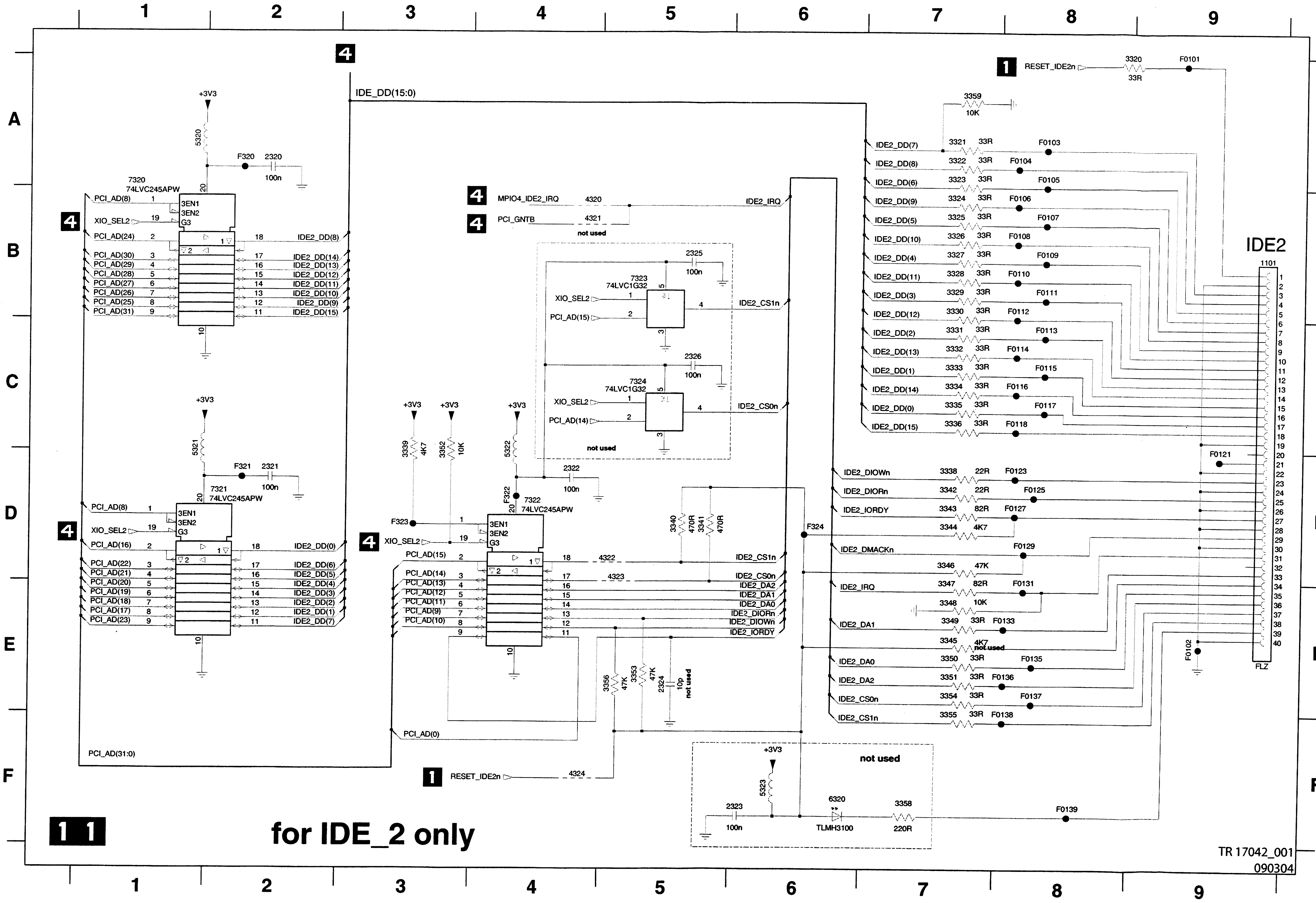
A: DC, 200mV/Div, 5us/Div

IC7005 pin 176 PR_FAROUDJA



A: DC, 200mV/Div, 5us/Div

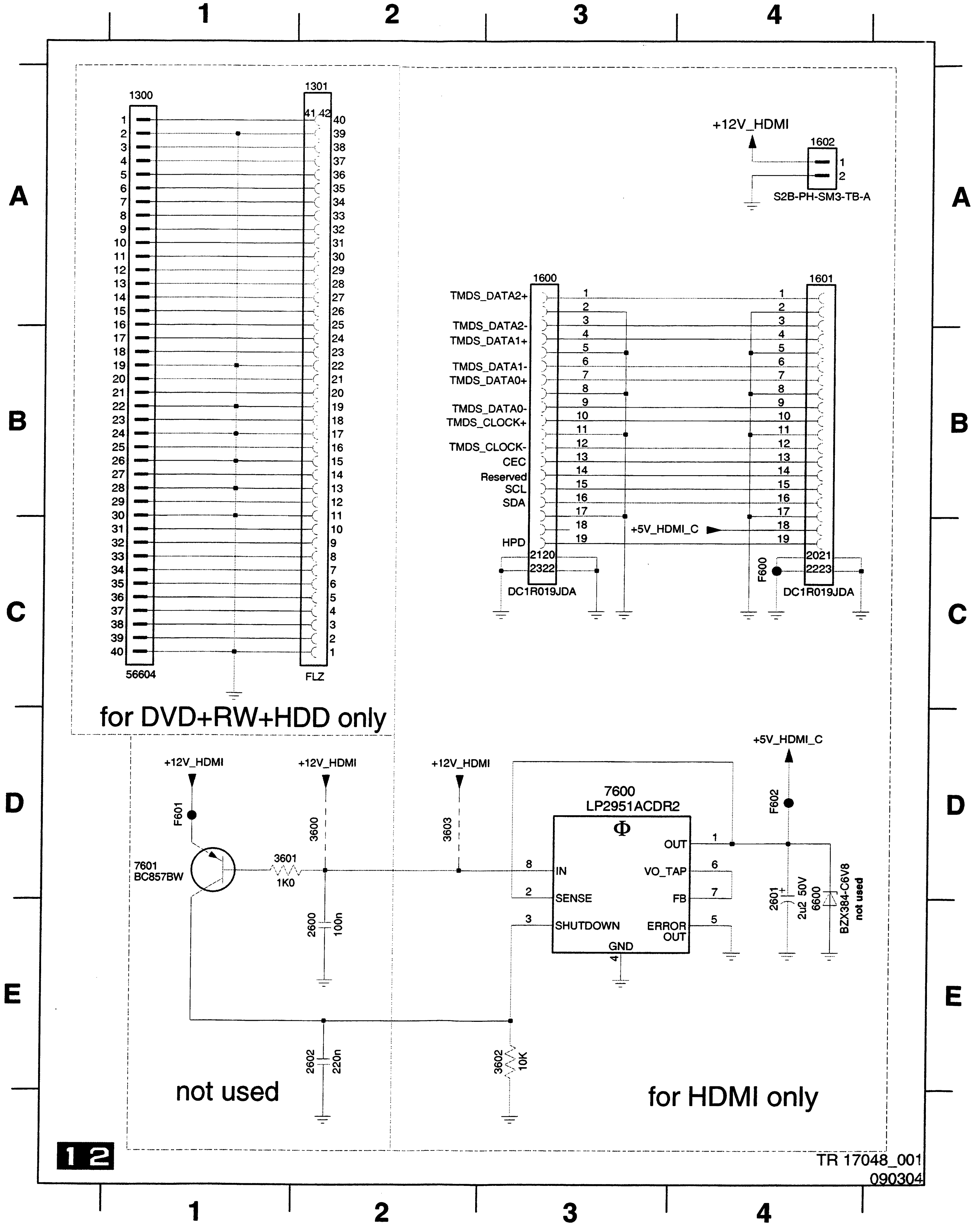
Digital Board Chrysalis F: IDE 2


1 1
for IDE_2 only
IDE2
1101
FLZ
IDE_DD(15:0)
PCI_AD(31:0)
7320 74LVC245APW
7321 74LVC245APW
7322 74LVC245APW
7323 74LVC1G32
7324 74LVC1G32
RESET_IDE2n
MPIO4_IDE2_IRQ
PCI_GNTB
XIO_SEL2
IDE2_IRQ
IDE2_CS1n
IDE2_CS0n
IDE2_DIOWn
IDE2_DIORn
IDE2_IORDY
IDE2_DMACKn
IDE2_DA0
IDE2_DA1
IDE2_DA2
+3V3
not used
TLMH3100
TR 17042_001
090304

1101	B9
2320	A2
2321	D2
2322	D4
2323	F6
2324	E5
2325	B5
2326	C5
3320	A8
3321	A7
3322	A7
3323	A7
3324	B7
3325	B7
3326	B7
3327	B7
3328	B7
3329	B7
3330	B7
3331	C7
3332	C7
3333	C7
3334	C7
3335	C7
3336	C7
3338	D7
3339	D3
3340	D5
3341	D5
3342	D7
3343	D7
3344	D7
3345	E7
3346	D7
3347	E7
3348	E7
3349	E7
3350	E7
3351	E7
3352	D3
3353	E5
3354	E7
3355	F7
3356	E5
3358	F7
3359	A7
4320	B4
4321	B4
4322	D5
4323	D5
4324	F4
5320	A1
5321	C1
5322	C4
5323	F6
6320	F6
7320	A1
7321	D1
7322	D3
7323	B5
7324	C5
F0101	A8
F0102	E9
F0103	A8
F0104	A8
F0105	A8
F0106	B8
F0107	B8
F0108	B8
F0109	B8
F0110	B8
F0111	B8
F0112	B8
F0113	C8
F0114	C8
F0115	C8
F0116	C8
F0117	C8
F0118	C8
F0121	D9
F0123	D8
F0125	D8
F0127	D8
F0129	D8
F0131	E8
F0133	E8
F0135	E8
F0136	E8
F0137	E8
F0138	F8
F0139	F8
F320	A2
F321	D2
F322	D4
F323	D3
F324	D6

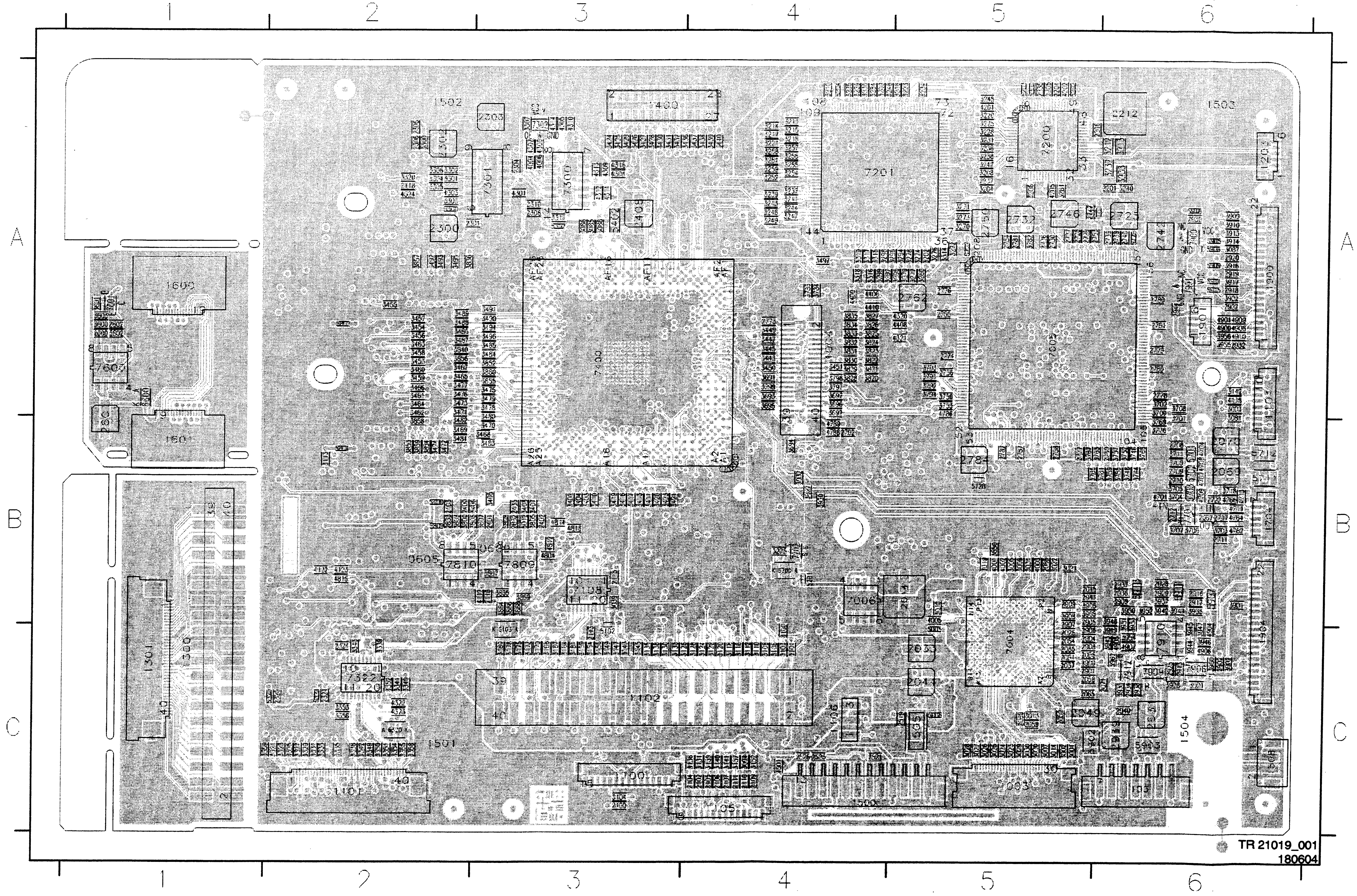
Digital Board Chrysalis F: IDE / HDMI Interface

1300 A1	**1600 A3**	**1602 A4**	**2601 D4**	**3600 D2**	**3602 E3**	**6600 D4**	**7601 D1**	**F601 D1**
1301 A2	**1601 A4**	**2600 E2**	**2602 E2**	**3601 D1**	**3603 D2**	**7600 D3**	**F600 C4**	**F602 D4**


1
2
3
4
A
B
C
D
E
1300
1301
56604
FLZ
for DVD+RW+HDD only
+12V_HDMI
1602
S2B-PH-SM3-TB-A
1600
1601
TMDS_DATA2+
TMDS_DATA2-
TMDS_DATA1+
TMDS_DATA1-
TMDS_DATA0+
TMDS_DATA0-
TMDS_CLOCK+
TMDS_CLOCK-
CEC
Reserved
SCL
SDA
HPD
+5V_HDMI_C
DC1R019JDA
F600
+5V_HDMI_C
F602
F601
7601
BC857BW
3601
1K0
3600
3603
2600
100n
7600
LP2951ACDR2
IN
SENSE
SHUTDOWN
OUT
VO_TAP
FB
ERROR OUT
GND
2601
2u2 50V
6600
BZX384-C6V8
not used
2602
220n
3602
10K
not used
for HDMI only
1 2
TR 17048_001
090304

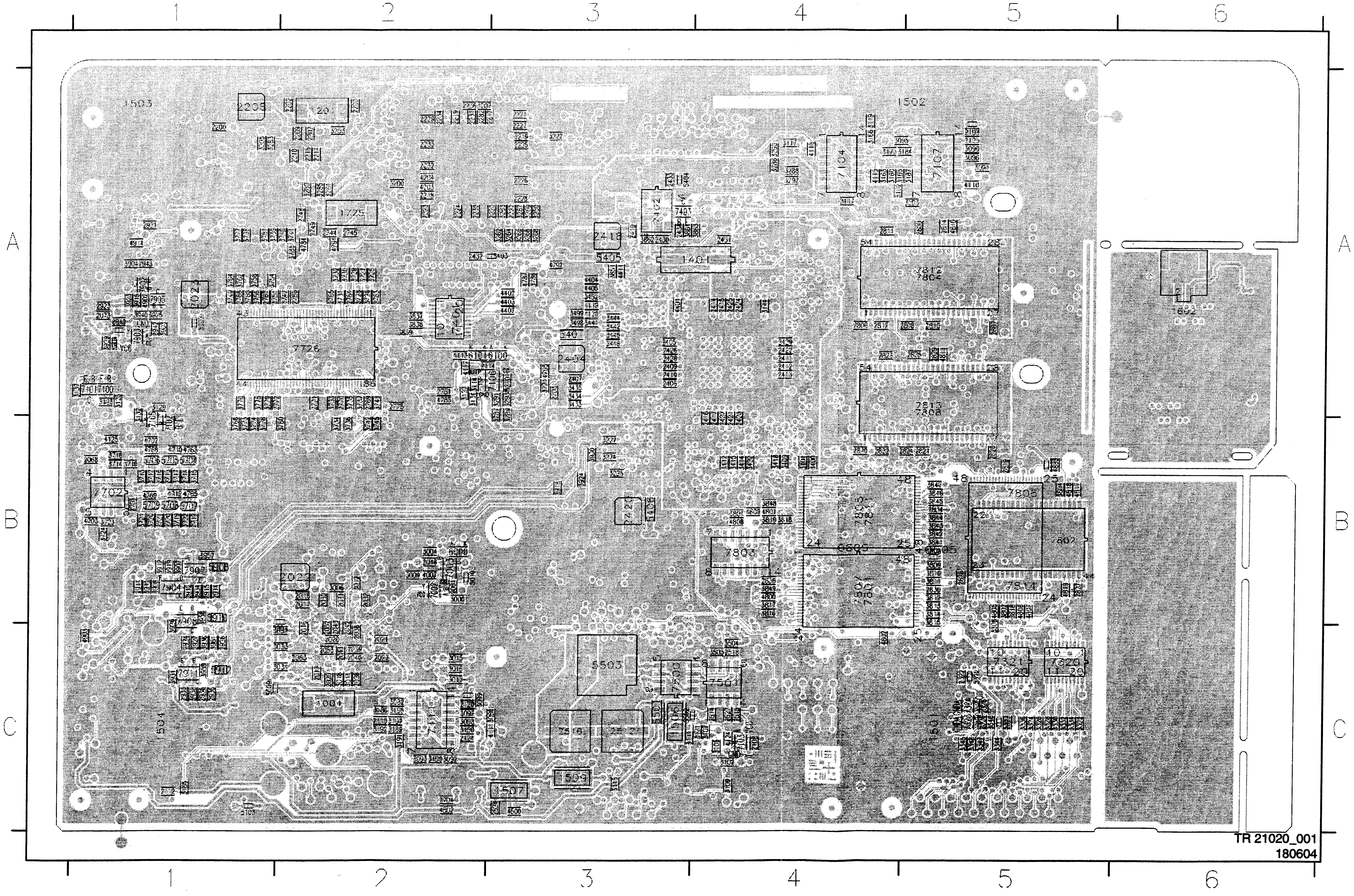
Layout Digital Board Chrysalis F (Top View)

0605	B2
0609	B3
1003	C5
1004	A4
1100	C3
1101	C2
1102	C3
1103	C6
1104	A6
1105	C4
1106	C4
1203	A6
1300	C1
1301	C1
1400	A3
1500	C4
1505	C5
1508	C6
1600	A1
1601	B1
1704	B6
1900	A6
1901	A6
1904	C6
2014	B5
2015	B5
2026	C5
2033	C5
2035	C5
2036	B6
2037	C5
2044	C5
2049	C5
2050	C5
2054	C5
2056	C5
2058	C5
2059	C5
2060	C5
2064	C5
2065	C5
2066	B5
2067	B6
2069	B6
2070	B6
2071	C6
2100	C3
2102	C4
2104	C4
2105	C4
2106	C4
2107	C4
2109	C4
2110	C4
2111	C4
2113	C3
2115	B3
2116	B3
2118	A2
2201	A6
2204	A5
2205	A5
2206	A5
2212	A6
2235	A5
2237	A5
2300	A2
2301	A2
2302	A2
2303	A3
2304	A3
2305	A2
2306	A2
2308	A3
2310	A3
2320	C2
2321	C2
2324	C2
2400	B2
2401	B3
2402	B3
2403	B2
2408	A3
2435	B3
2519	C5
2521	C4
2525	C4
2526	C4
2600	A1
2601	B1
2602	A1
2702	B4
2708	B6
2709	B6
2710	B6
2711	B6
2712	B6
2717	B6
2722	B6
2725	A6
2726	A5
2727	A5
2728	A5
2729	A5
2730	A5
2732	A5
2738	A6
2739	A6
2740	A6
2742	A6
2746	A5
2747	A5
2750	A5
2753	A5
2754	A5
2755	A5
2756	A5
2757	B5
2758	B5
2759	B6
2760	A6
2761	A6
2762	A5
2773	A4
2774	A5
2775	B5
2776	A5
2777	B5
2778	A6
2779	A6
2780	A6
2781	A5
2782	B5
2784	B5
2832	B3
2833	B2
2900	C5
2901	C5
2902	C6
2903	C5
2904	C5
2905	B5
2906	C5
2907	B5
2908	B5
2909	B5
2913	C6
2916	B6
2917	B6
2918	A6
2919	A6
2920	A6
2922	A6
2925	C6
2928	B6
2929	B6
2930	A6
2931	C6
2932	A6
2934	C6
2937	B6
2938	C6
2939	C6
2940	C6
2941	B5
2944	A6
3001	C5
3002	C5
3003	A6
3005	B5
3007	C5
3008	B5
3010	B5
3013	C5
3014	C5
3019	B5
3020	C5
3021	B5
3022	B5
3023	C5
3024	C5
3025	C5
3026	C5
3027	C5
3028	C5
3029	C5
3030	C5
3031	B5
3039	B3
3081	A6
3085	A3
3086	A3
3087	A6
3088	A3
3094	C4
3100	C4
3101	C4
3103	C4
3104	C3
3106	C4
3108	C4
3110	C4
3112	C4
3113	B2
3116	C4
3118	C4
3120	C4
3122	C4
3124	C4
3126	C4
3128	C4
3130	C3
3131	C4
3133	C3
3135	C3
3136	C4
3138	C3
3139	C4
3140	C4
3141	C4
3142	A6
3143	C3
3145	C3
3147	C3
3149	C3
3152	C4
3154	C3
3156	C3
3157	C4
3159	C3
3161	C3
3164	C3
3167	C3
3168	C3
3170	C3
3172	C3
3175	C3
3178	C3
3180	C3
3202	A5
3204	A5
3206	A5
3208	A5
3209	A4
3210	A4
3211	A4
3212	A6
3213	A6
3214	A4
3215	A4
3216	A5
3217	A4
3218	A4
3220	A5
3221	A4
3223	A5
3225	A5
3228	A5
3229	A4
3230	A4
3231	A5
3232	A6
3233	A6
3234	A5
3235	A4
3236	A5
3237	A4
3238	A5
3239	A4
3240	A6
3241	A4
3242	A5
3243	A4
3244	A4
3245	A5
3246	A4
3247	A4
3248	A4
3249	A4
3251	A4
3252	A4
3254	A4
3255	A4
3256	A4
3257	A4
3258	A4
3259	A4
3260	A5
3261	A5
3270	A5
3271	A5
3272	A5
3273	A5
3274	A5
3275	B4
3276	A5
3277	A5
3278	A5
3279	A5
3284	A4
3294	A5
3295	A5
3296	A4
3297	A4
3298	A4
3299	A4
3300	A2
3301	A2
3302	A2
3303	A2
3304	A2
3305	A2
3306	A2
3307	A3
3311	A3
3314	A5
3315	A4
3316	A4
3317	A4
3318	A4
3319	A4
3320	A2
3321	C2
3323	C2
3325	C2
3327	C2
3329	C2
3331	C2
3333	C2
3335	C2
3338	C2
3339	C2
3340	C2
3341	C2
3342	C2
3343	C2
3349	C2
3350	C2
3351	C2
3352	C2
3353	C2
3354	C2
3355	C2
3356	C2
3358	C2
3359	C2
3402	B3
3403	B3
3404	B3
3405	B3
3406	B3
3407	B3
3408	B3
3410	B3
3411	B3
3413	B3
3416	B3
3417	B3
3419	B3
3420	B3
3421	B3
3423	B3
3424	A3
3425	A3
3426	A3
3427	A3
3428	A3
3429	A3
3430	A3
3431	A3
3432	A3
3436	A3
3437	A4
3438	A4
3439	A4
3440	A4
3443	A4
3445	A4
3447	A4
3449	A4
3450	A4
3451	A4
3453	A2
3454	A2
3455	A2
3456	A2
3457	A2
3458	A2
3459	A2
3460	A2
3461	A2
3462	A2
3463	A2
3464	A2
3465	A2
3466	A2
3467	A2
3468	B3
3469	B2
3470	B3
3471	A2
3472	B2
3473	A2
3474	B2
3475	A3
3476	A2
3477	A2
3478	A3
3479	A3
3480	B3
3481	B2
3482	B2
3483	B3
3484	A3
3485	A3
3486	A2
3487	A2
3488	A2
3489	A2
3490	A3
3491	A3
3492	A2
3493	A2
3494	A3
3495	A2
3496	A3
3497	A4
3600	A1
3601	A1
3602	A1
3603	A1
3691	A4
3692	A4
3693	A4
3694	B4
3695	A4
3696	A4
3697	A4
3700	A6
3701	A6
3702	A6
3703	B6
3704	B6
3705	B6
3706	B6
3707	B6
3708	A6
3709	B6
3711	B6
3718	B6
3744	B6
3746	B6
3748	B6
3750	A5
3752	B6
3753	A5
3755	B6
3757	B6
3759	B6
3761	B6
3763	B5
3765	B5
3767	B5
3768	B6
3769	B6
3776	B6
3782	A5
3783	A4
3784	A4
3791	A5
3792	A5
3793	A5
3794	A5
3797	A4
3798	A4
3799	A4
3800	B2
3803	B2
3805	B3
3806	B3
3807	B3
3820	A4
3821	A4
3822	A4
3823	A4
3824	A4
3825	A4
3826	A4
3827	A4
3828	A4
3829	A4
3830	A4
3831	A4
3832	A4
3833	A4
3834	A4
3835	A4
3836	A2
3840	A2
3850	B5
3852	A3
3853	B2
3854	B2
3855	A3
3856	A2
3857	A2
3858	B2
3859	B2
3860	A3
3864	B3
3865	B3
3866	B3
3867	B3
3868	B3
3869	B3
3901	B6
3902	C6
3905	B5
3906	B5
3909	A6
3910	A6
3913	A6
3914	A6
3916	A6
3917	A6
3920	B4
3921	C6
3922	A6
3927	B4
3928	C6
3932	B4



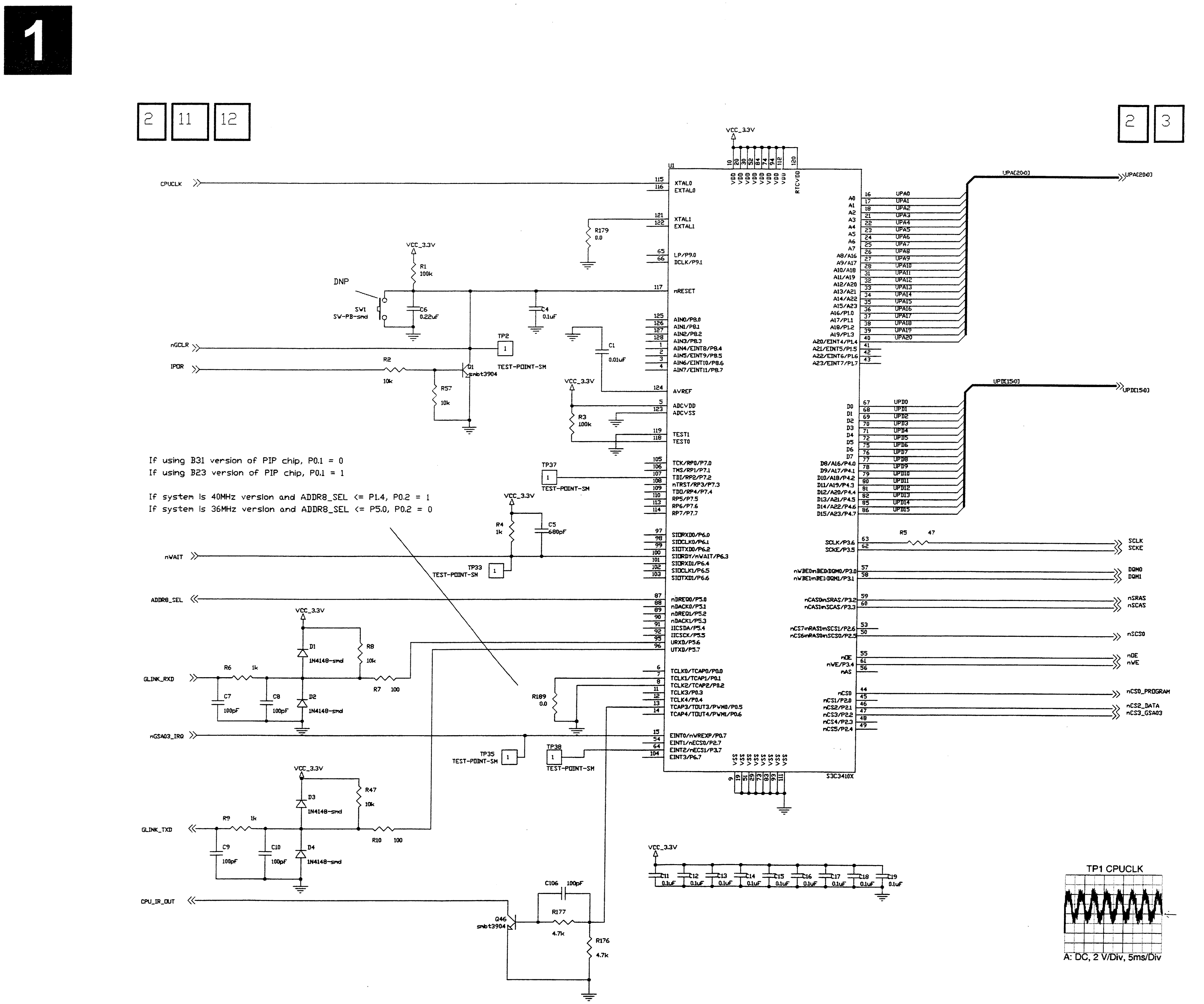
Layout Digital Board Chrysalis F (Bottom View)

1001	C2
1201	A2
1401	A4
1506	C3
1507	C3
1509	C3
1602	A6
1725	A2
2016	C2
2017	B2
2018	B2
2019	C2
2020	C2
2021	C2
2022	B2
2023	A1
2027	C2
2028	C2
2029	C2
2030	B2
2031	B2
2032	B2
2038	C2
2039	C2
2040	C2
2041	C2
2042	C2
2043	C2
2048	B2
2052	C2
2053	C2
2061	B2
2063	C2
2068	B1
2073	A1
2101	A3
2103	A5
2108	C4
2112	C1
2114	A2
2117	A4
2119	C2
2120	C2
2124	C2
2125	A5
2200	A1
2202	A2
2203	A2
2207	A2
2208	A1
2209	A2
2210	A2
2214	A2
2215	A2
2217	A2
2218	A2
2219	A2
2220	A3
2221	A3
2222	A3
2223	A2
2224	A2
2225	A3
2226	A3
2227	A3
2228	A3
2229	A2
2230	A2
2231	A2
2232	A2
2233	A2
2234	A2
2236	A2
2322	C5
2323	C5
2325	C5
2326	C5
2404	A3
2405	A3
2406	A3
2407	A3
2409	A3
2410	A3
2411	A4
2412	A4
2413	A4
2414	A4
2415	A4
2416	B4
2417	B4
2418	A3
2419	A3
2420	B3
2421	B4
2422	A4
2423	B4
2424	A4
2425	A4
2426	A3
2427	B4
2428	A3
2429	A4
2430	A3
2431	A4
2432	A2
2433	A3
2434	A3
2512	C3
2514	C4
2515	C4
2516	C3
2518	C4
2524	C3
2527	C4
2701	B1
2703	A3
2704	C2
2714	B1
2715	B1
2716	B1
2719	B1
2720	B1
2721	B1
2744	A2
2745	A2
2748	A2
2749	A2
2751	A2
2763	A2
2764	A2
2765	A2
2766	A2
2767	A1
2768	A1
2769	A2
2770	A2
2771	A2
2772	A1
2806	A4
2807	A5
2808	A5
2809	A5
2810	A5
2811	A4
2812	A4
2814	A5
2818	B5
2819	B5
2820	B4
2821	B5
2822	B4
2823	A4
2824	B5
2825	A5
2826	B5
2827	B5
2828	B5
2829	A5
2830	B5
2834	B5
2836	B4
2910	A1
2911	B1
2912	B1
2914	B1
2915	B1
2921	A1
2923	A1
2924	C1
2926	C1
2927	C1
2933	C1
2935	C1
2936	C1
2942	A1
2943	A1
3000	B2
3004	B2
3006	B2
3009	B2
3011	C2
3012	B2
3015	C2
3016	C2
3017	C2
3018	C2
3032	C2
3033	C2
3034	C2
3080	C3
3082	C2
3090	A5
3091	A5
3092	C2
3093	C2
3095	A4
3096	A5
3097	C2
3098	C2
3099	C2
3102	C4
3105	C4
3107	C4
3109	C4
3111	C3
3114	A2
3115	C3
3117	A4
3119	A4
3121	C4
3123	A1
3125	A1
3127	A2
3129	A1
3132	B1
3134	A2
3137	A1
3144	A4
3150	C2
3160	A4
3162	A4
3163	A4
3165	A4
3166	A4
3173	A4
3184	A4
3185	C1
3186	C2
3187	A5
3189	C2
3191	C2
3192	C2
3195	C2
3197	C2
3199	C2
3200	A2
3203	A5
3205	A1
3207	A2
3219	A3
3222	A3
3224	B3
3226	B3
3227	B3
3250	A3
3253	A2
3262	A3
3263	A3
3264	A3
3265	A3
3266	A3
3267	A3
3268	A3
3269	A3
3280	A2
3281	A2
3282	A2
3283	A1
3285	A2
3286	A4
3287	A3
3288	A4
3289	A3
3290	A4
3291	A3
3292	A4
3293	A3
3322	C5
3324	C5
3326	C5
3328	C5
3330	C5
3332	C5
3334	C5
3336	C5
3344	C5
3345	C5
3346	C5
3347	C5
3348	C5
3400	B4
3401	B4
3409	B4
3412	B4
3414	B4
3415	B4
3418	B4
3422	B4
3433	A3
3434	A3
3435	A3
3441	A3
3442	A3
3444	A3
3446	A3
3448	A3
3452	A3
3498	A3
3499	A3
3503	C4
3504	C4
3710	B1
3712	B1
3713	B1
3714	B1
3715	B1
3716	B1
3717	B1
3719	B1
3720	B1
3721	B1
3722	B1
3723	B1
3724	B1
3725	A2
3726	A2
3727	A2
3728	A2
3729	A2
3730	A2
3731	A2
3732	A2
3733	A2
3734	B2
3735	A2
3736	B2
3737	A2
3738	A1
3739	A1
3740	A2
3741	A2
3742	B2
3743	A2
3745	B2
3747	A2
3749	A1
3751	A1
3754	A1
3756	A1
3758	A1
3760	A1
3762	A1
3764	A1
3766	B1
3770	A1
3773	B1
3774	B1
3775	A1
3777	A1
3778	B1
3779	A1
3780	B2
3781	A1
3785	A2
3786	A3
3801	B4
3802	B5
3804	B5
3808	C5
3809	B5
3810	B5
3811	B5
3812	B5
3813	B5
3814	B5
3815	B5
3816	B4
3817	B4
3818	B4
3819	B4
3837	A2
3838	A2
3839	A2
3841	B5
3842	B5
3843	B5
3844	B5
3845	B5
3846	B5
3847	B5
3848	B4
3849	B4
3851	A3
3861	A3
3862	A3
3863	A4
3903	A1
3904	A1
3907	B1
3908	B1
3911	B1
3912	B1
3915	A1
3918	B3
3919	B1
3923	A1
3924	B3
3925	A1
3926	C1
3929	A1
3930	B3
3931	C1
3934	B1
3936	C1
3938	C1
3940	A1
3957	B1
3958	B1
3959	C1
3961	C1
4007	B2
4110	A5
4111	C3
4113	A2
4115	A4
4116	A4
4117	A2
4119	A3
4120	A3
4124	C4
4125	B1
4203	A2
4204	A2
4401	A3
4402	A3
4403	A3
4404	A3
4405	A3
4407	A3
4500	C3
4502	C2
4702	B1
4703	B1
4710	B1
4712	B1
4763	B1
4765	B1
4768	B1
4769	B1
4784	A2
4785	A2
4787	A3
4792	A3
4794	A2
4800	B4
4801	B4
4802	C4
4803	B5
4805	B5
4806	B5
4807	B5
4808	B4
4809	B4
4810	A5
4811	A5
4817	B5
4818	B5
4819	B5
4902	A1
4903	C1
4911	A1
5001	B2
5002	A1
5009	C1
5010	B2
5100	A5
5103	C1
5104	C2
5322	C5
5323	C5
5401	A3
5403	A3
5404	A3
5405	A3
5406	B3
5501	C3
5502	C4
5503	C3
5704	B1
5705	B1
5706	B1
5707	B1
5708	B1
5709	B1
5803	B5
5805	B5
5901	A1
5904	A1
5908	B1
5910	B1
5912	C1
6000	B2
6100	A3
6101	A2
7002	B2
7003	B2
7100	A1
7101	A1
7102	B1
7103	C4
7104	A4
7105	B1
7106	A3
7107	A5
7111	C2
7320	C5
7321	C5
7323	C5
7324	C5
7401	A2
7402	A3
7403	A3
7500	C3
7501	C4
7702	B1
7726	A2
7801	B4
7802	B5
7803	B4
7804	A5
7805	B4
7806	B5
7807	B4
7808	A5
7811	B4
7812	A5
7813	A5
7814	B5
7902	A1
7903	A1
7904	B1
7905	A1
7907	B1
7908	B1
7911	C1



TR 21020_001
180604

EPG Board: MCU


1
2
11
12
2
3
CPUCLK
nGCLR
IPOR
nWAIT
ADDR8_SEL
GLINK_RXD
nGSA03_IRQ
GLINK_TXD
CPU_IR_OUT
VCC_3.3V
DNP
SW1
SW-PB-smd
R1
100k
C6
0.22uF
C4
0.1uF
R2
10k
R57
10k
Q1
smbt3904
TP2
TEST-POINT-SM
R179
0.0
C1
0.01uF
R3
100k
TP37
TEST-POINT-SM
R4
1k
C5
680pF
TP33
TEST-POINT-SM
D1
1N4148-smd
D2
1N4148-smd
R6
1k
R7
100
R8
10k
C7
100pF
C8
100pF
R189
0.0
TP35
TEST-POINT-SM
TP38
TEST-POINT-SM
R47
10k
D3
1N4148-smd
D4
1N4148-smd
R9
1k
R10
100
C9
100pF
C10
100pF
C106
100pF
R177
4.7k
Q46
smbt3904
R176
4.7k
U1
S3C3410X
XTAL0
EXTAL0
XTAL1
EXTAL1
LP/P9.0
DCLK/P9.1
nRESET
AVREF
ADCVDD
ADCVSS
TEST1
TEST0
UPA[20:0]
UPD[15:0]
R5
47
SCLK
SCKE
DQM0
DQM1
nSRAS
nSCAS
nSCS0
nOE
nWE
nCS0_PROGRAM
nCS2_DATA
nCS3_GSA03
C11
C12
C13
C14
C15
C16
C17
C18
C19
0.1uF
TP1 CPUCLK
A: DC, 2 V/Div, 5ms/Div

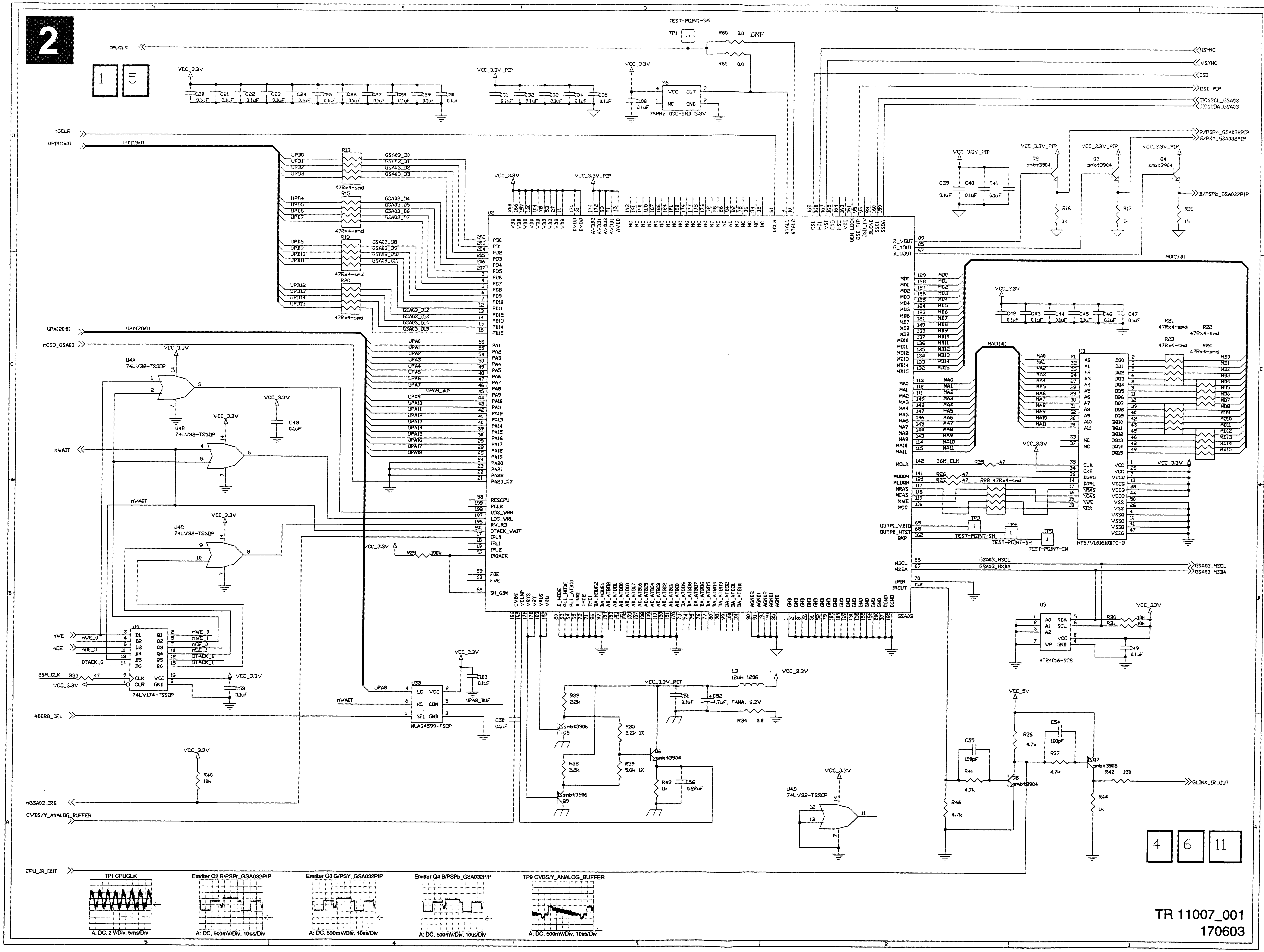
If using B31 version of PIP chip, P0.1 = 0
If using B23 version of PIP chip, P0.1 = 1

If system is 40MHz version and ADDR8_SEL <= P1.4, P0.2 = 1
If system is 36MHz version and ADDR8_SEL <= P5.0, P0.2 = 0

C1	C3
C10	A5
C106	A3
C11	A3
C12	A3
C13	A3
C14	A3
C15	A3
C16	A3
C17	A3
C18	A2
C19	A2
C4	C4
C5	C4
C6	C4
C7	B5
C8	B5
C9	A5
D1	B4
D2	B4
D3	A4
D4	A4
Q1	C4
Q46	A4
R1	C4
R10	A4
R176	A3
R177	A3
R179	D3
R189	B4
R2	C4
R3	C3
R4	C4
R47	B4
R5	B2
R57	C4
R6	B5
R7	B4
R8	B4
R9	A5
SW1	C4
TP2	C4
TP33	B4
TP35	B4
TP37	C4
TP38	B4
U1	B3

TR 11006_001
170603

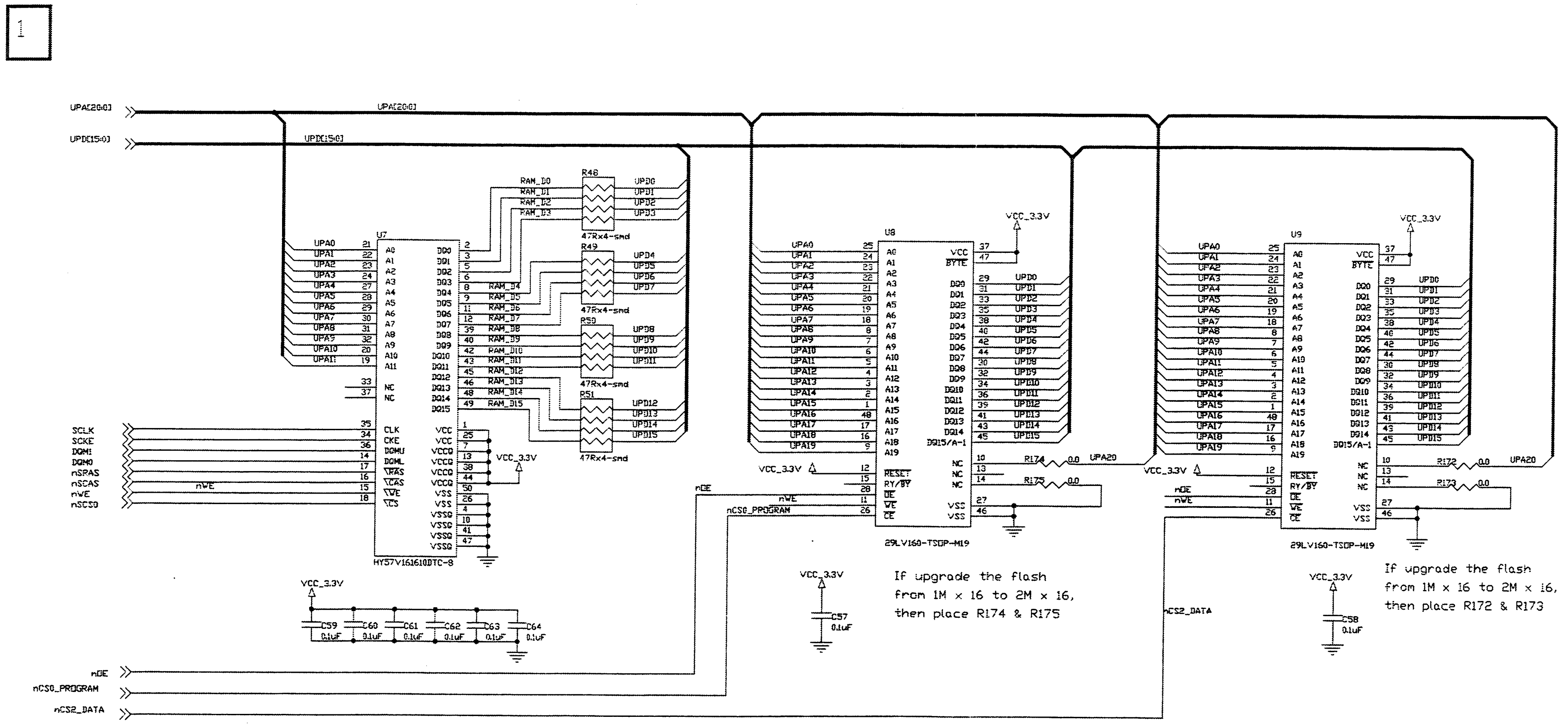
EPG Board: GSA03


2
1 5
4 6 11
CPUCLK
TEST-POINT-SM
TP1
R60 0.0 DNP
R61 0.0
HSYNC
VSYNC
CSI
OSD_PIP
IICSSCL_GSA03
IICSSDA_GSA03
R/PSPr_GSA032PIP
G/PSY_GSA032PIP
B/PSPb_GSA032PIP
VCC_3.3V
VCC_3.3V_PIP
Y6 36MHz OSC-SMD 3.3V
nGCLR
UPD[15:0]
UPA[20:0]
nC23_GSA03
R13 47Rx4-smd
R15 47Rx4-smd
R19 47Rx4-smd
R20 47Rx4-smd
U4A 74LV32-TSSOP
U4B 74LV32-TSSOP
U4C 74LV32-TSSOP
U4D 74LV32-TSSOP
C48 0.1uF
nWAIT
U6 74LV174-TSSOP
nWE
nOE
DTACK_0
36M_CLK
R33 47
U33 NLAS4599-TSOP
UPA8
UPA8_BUF
ADDR0_SEL
C103 0.1uF
C50 0.1uF
R29 100k
R40 10k
nGSA03_IRQ
CVBS/Y_ANALOG_BUFFER
CPU_IR_OUT
U2 GSA03
Q2 smbt3904
Q3 smbt3904
Q4 smbt3904
R16 1k
R17 1k
R18 1k
MD[15:0]
MA[11:0]
U3 HY57V161610DTC-8
R21 47Rx4-smd
R22 47Rx4-smd
R23 47Rx4-smd
R24 47Rx4-smd
R25 47
R26 47
R27 47
R28 47Rx4-smd
TP3
TP4
TP5
TEST-POINT-SM
GSA03_MSCL
GSA03_MSDA
U5 AT24C16-SO8
R30 10k
R31 10k
C49 0.1uF
VCC_3.3V_REF
L3 12uH 1206
C51 0.1uF
C52 4.7uF, TANA, 6.3V
R34 0.0
R32 2.2k
Q5 smbt3906
R35 2.2k 1%
Q6 smbt3904
R38 2.2k
R39 5.6k 1%
Q9 smbt3906
R43 1k
C56 0.22uF
VCC_5V
C55 100pF
R41 4.7k
R46 4.7k
R36 4.7k
C54 100pF
R37 4.7k
Q8 smbt3904
Q7 smbt3906
R42 150
R44 1k
GLINK_IR_OUT
TP1 CPUCLK
A: DC, 2 V/Div, 5ms/Div
Emitter Q2 R/PSPr_GSA032PIP
A: DC, 500mV/Div, 10us/Div
Emitter Q3 G/PSY_GSA032PIP
A: DC, 500mV/Div, 10us/Div
Emitter Q4 B/PSPb_GSA032PIP
A: DC, 500mV/Div, 10us/Div
TP9 CVBS/Y_ANALOG_BUFFER
A: DC, 500mV/Div, 10us/Div
TR 11007_001
170603

C103	B4
C106	D3
C20	D5
C21	D5
C22	D5
C23	D5
C24	D4
C25	D4
C26	D4
C27	D4
C28	D4
C29	D4
C30	D4
C32	D3
C33	D3
C34	D3
C35	D3
C39	D2
C40	D2
C41	D2
C42	C2
C43	C1
C44	C1
C45	C1
C46	C1
C47	C1
C48	C4
C49	B1
C50	A3
C51	B3
C52	B3
C53	B5
C54	A1
C55	A2
C56	A3
L3	B3
Q2	D1
Q3	D1
Q4	D1
Q5	A3
Q6	A3
Q7	A1
Q8	A1
Q9	A3
R13	D4
R15	D4
R16	D1
R17	D1
R18	D1
R21	C1
R22	C1
R23	C1
R24	C1
R25	C2
R26	B2
R27	B2
R28	B2
R29	B4
R30	B1
R31	B1
R32	B3
R33	B5
R34	A3
R35	A3
R36	A1
R37	A1
R38	A3
R39	A3
R40	A5
R41	A2
R42	A1
R43	A3
R44	A1
R46	A2
R60	D3
R61	D3
TP1	D3
TP3	B2
TP4	B2
U2	C3
U3	C1
U33	B4
U4A	C5
U4B	C5
U4C	B5
U4D	A2
U5	B1
U6	B5
Y6	D3

EPG Board: Memory

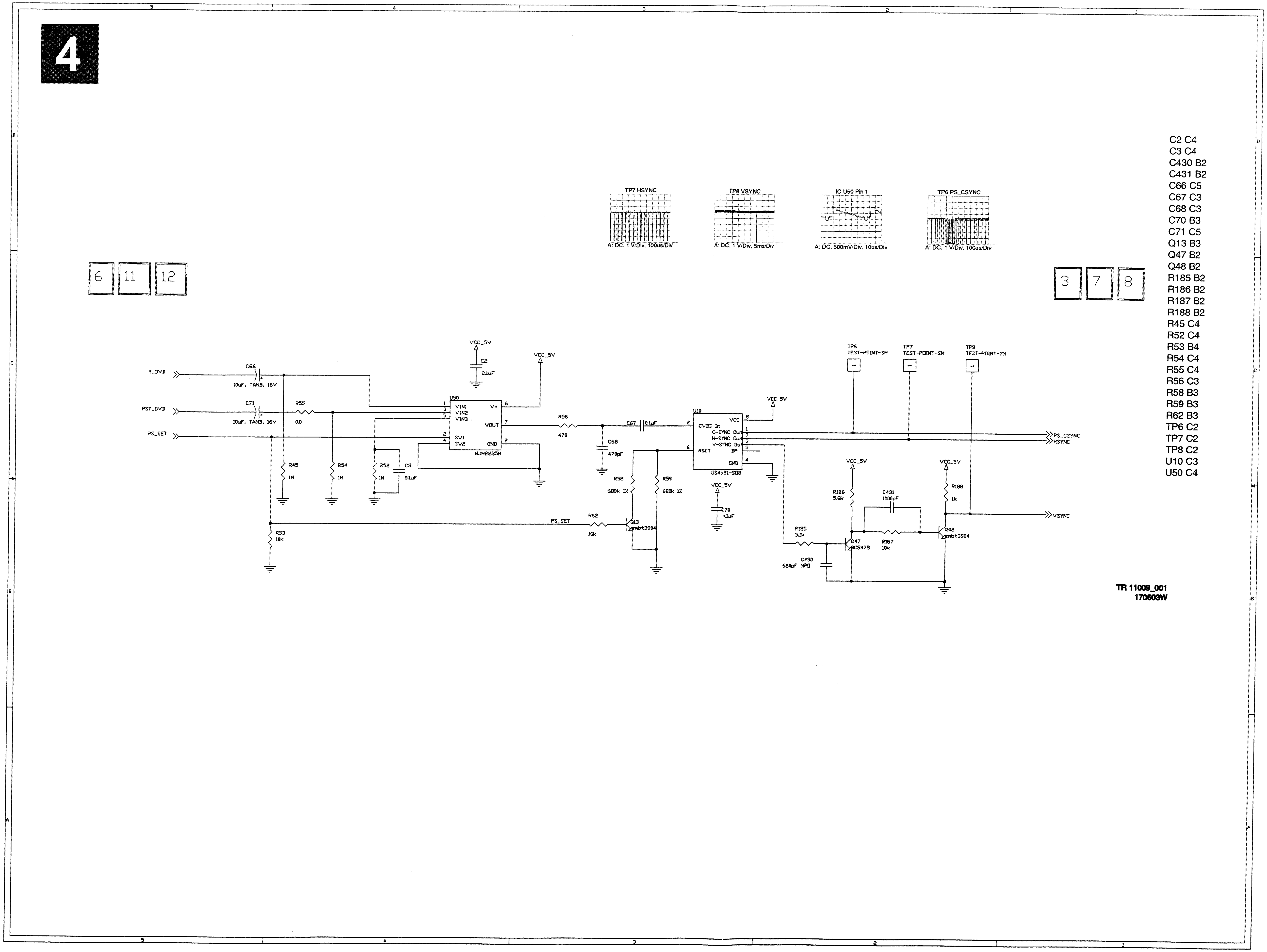
3


1
UPA[20:0]
UPD[15:0]
U7
HY57V161610DTC-8
R46
R49
R50
R51
47Rx4-smd
RAM_D0
UPD0
SCLK
SCKE
DQM1
DQM0
nSRAS
nSCAS
nWE
nSCS0
VCC_3.3V
C59 0.1uF
C60 0.1uF
C61 0.1uF
C62 0.1uF
C63 0.1uF
C64 0.1uF
nOE
nCS0_PROGRAM
nCS2_DATA
U8
29LV160-TSOP-M19
R174 0.0
R175 0.0
UPA20
C57 0.1uF
If upgrade the flash from 1M x 16 to 2M x 16, then place R174 & R175
U9
29LV160-TSOP-M19
R172 0.0
R173 0.0
C58 0.1uF
If upgrade the flash from 1M x 16 to 2M x 16, then place R172 & R173

C57	B3
C58	B2
C59	B4
C60	B4
C61	B4
C62	B4
C63	B4
C64	B4
R172	C2
R173	B2
R174	C3
R175	B3
R48	C4
R49	C4
R50	C4
R51	C4
U7	C4
U8	C3
U9	C2

TR 11008_001
170603

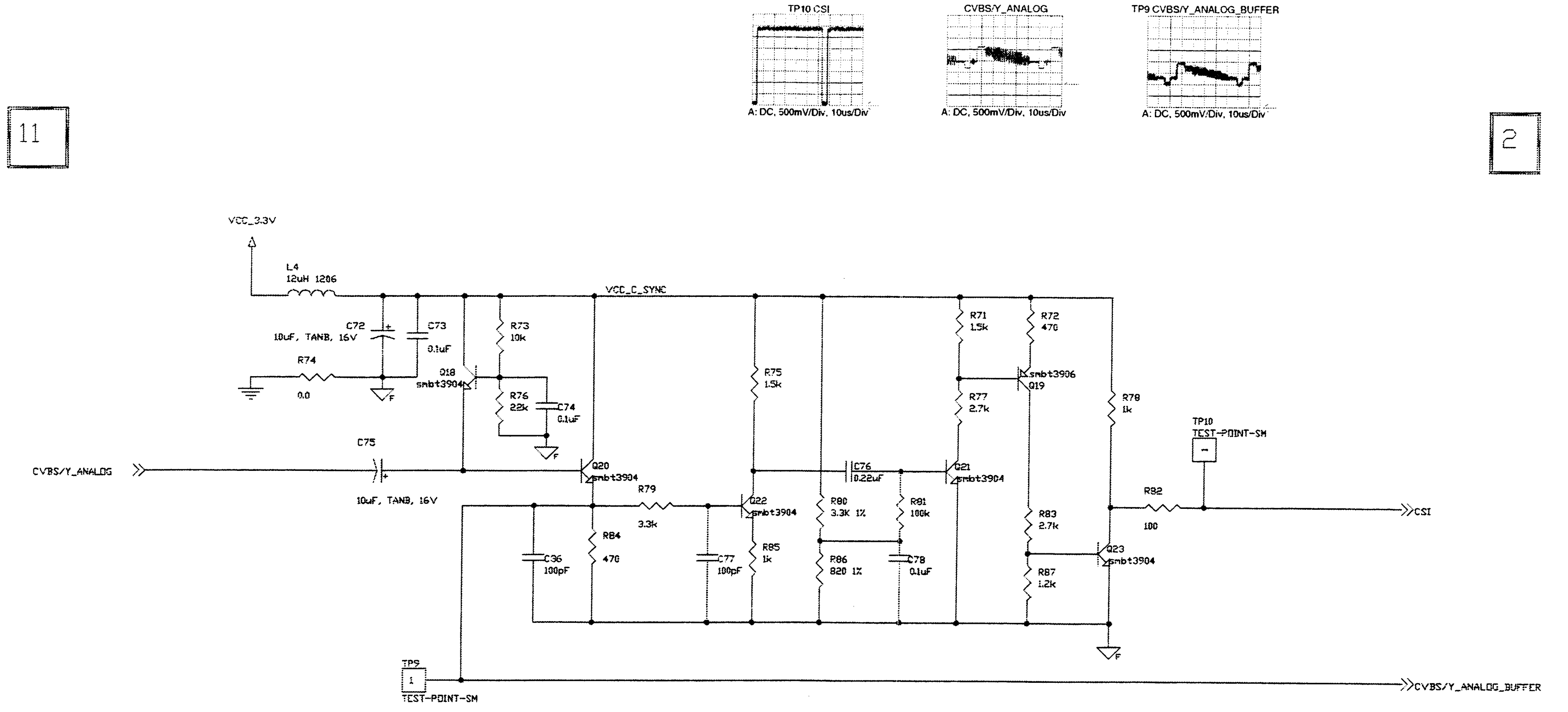
EPG Board: Sync Separator for System


4
6
11
12
3
7
8
TP7 HSYNC
A: DC, 1 V/Div, 100us/Div
TP8 VSYNC
A: DC, 1 V/Div, 5ms/Div
IC U50 Pin 1
A: DC, 500mV/Div, 10us/Div
TP6 PS_CSYNC
A: DC, 1 V/Div, 100us/Div
Y_DVD
PSY_DVD
PS_SET
C66
10uF, TANB, 16V
C71
10uF, TANB, 16V
R55
0.0
VCC_5V
C2
0.1uF
VCC_5V
U50
VIN1
VIN2
VIN3
V+
VOUT
SW1
SW2
GND
NJM2235M
R45
1M
R54
1M
R52
1M
C3
0.1uF
R53
10k
R56
470
C68
470pF
C67
0.1uF
U10
CVBS In
C-SYNC Out
H-SYNC Out
V-SYNC Out
RSET
BP
VCC
GND
GS4981-SO8
VCC_5V
R58
680k 1%
R59
680k 1%
PS_SET
R62
10k
Q13
smbt3904
VCC_5V
C70
0.1uF
TP6
TEST-POINT-SM
TP7
TEST-POINT-SM
TP8
TEST-POINT-SM
PS_CSYNC
HSYNC
VCC_5V
R186
5.6k
C431
1000pF
VCC_5V
R188
1k
VSYNC
R185
5.1k
C430
680pF NPO
Q47
BC847B
R187
10k
Q48
smbt3904
TR 11009_001
170603W

C2	C4
C3	C4
C430	B2
C431	B2
C66	C5
C67	C3
C68	C3
C70	B3
C71	C5
Q13	B3
Q47	B2
Q48	B2
R185	B2
R186	B2
R187	B2
R188	B2
R45	C4
R52	C4
R53	B4
R54	C4
R55	C4
R56	C3
R58	B3
R59	B3
R62	B3
TP6	C2
TP7	C2
TP8	C2
U10	C3
U50	C4

EPG Board: C-Sync Separator for data Capture

5


TP10 CSI
A: DC, 500mV/Div, 10us/Div
CVBS/Y_ANALOG
A: DC, 500mV/Div, 10us/Div
TP9 CVBS/Y_ANALOG_BUFFER
A: DC, 500mV/Div, 10us/Div
11
2
VCC_3.3V
L4
12uH 1206
VCC_C_SYNC
C72
10uF, TANB, 16V
C73
0.1uF
R73
10k
R74
0.0
Q18
smbt3904
R76
22k
C74
0.1uF
C75
CVBS/Y_ANALOG
10uF, TANB, 16V
Q20
smbt3904
R79
3.3k
C36
100pF
R84
470
C77
100pF
Q22
smbt3904
R85
1k
R75
1.5k
C76
0.22uF
R80
3.3K 1%
R81
100k
R86
820 1%
C78
0.1uF
Q21
smbt3904
R71
1.5k
R72
470
smbt3906
Q19
R77
2.7k
R83
2.7k
R87
1.2k
Q23
smbt3904
R78
1k
TP10
TEST-POINT-SM
R82
100
CSI
TP9
1
TEST-POINT-SM
CVBS/Y_ANALOG_BUFFER

C36	B3
C72	C4
C73	C4
C74	C3
C75	C4
C76	B3
C77	B3
C78	B3
L4	C4
Q18	C4
Q19	C2
Q20	B3
Q21	B3
Q22	B3
Q23	B2
R71	C3
R72	C2
R73	C4
R74	C4
R75	C3
R76	C4
R77	C3
R78	C2
R79	B3
R80	B3
R81	B3
R82	B2
R83	B2
R84	B3
R85	B3
R86	B3
R87	B2
TP10	C2
TP9	B4

TR 11010_001
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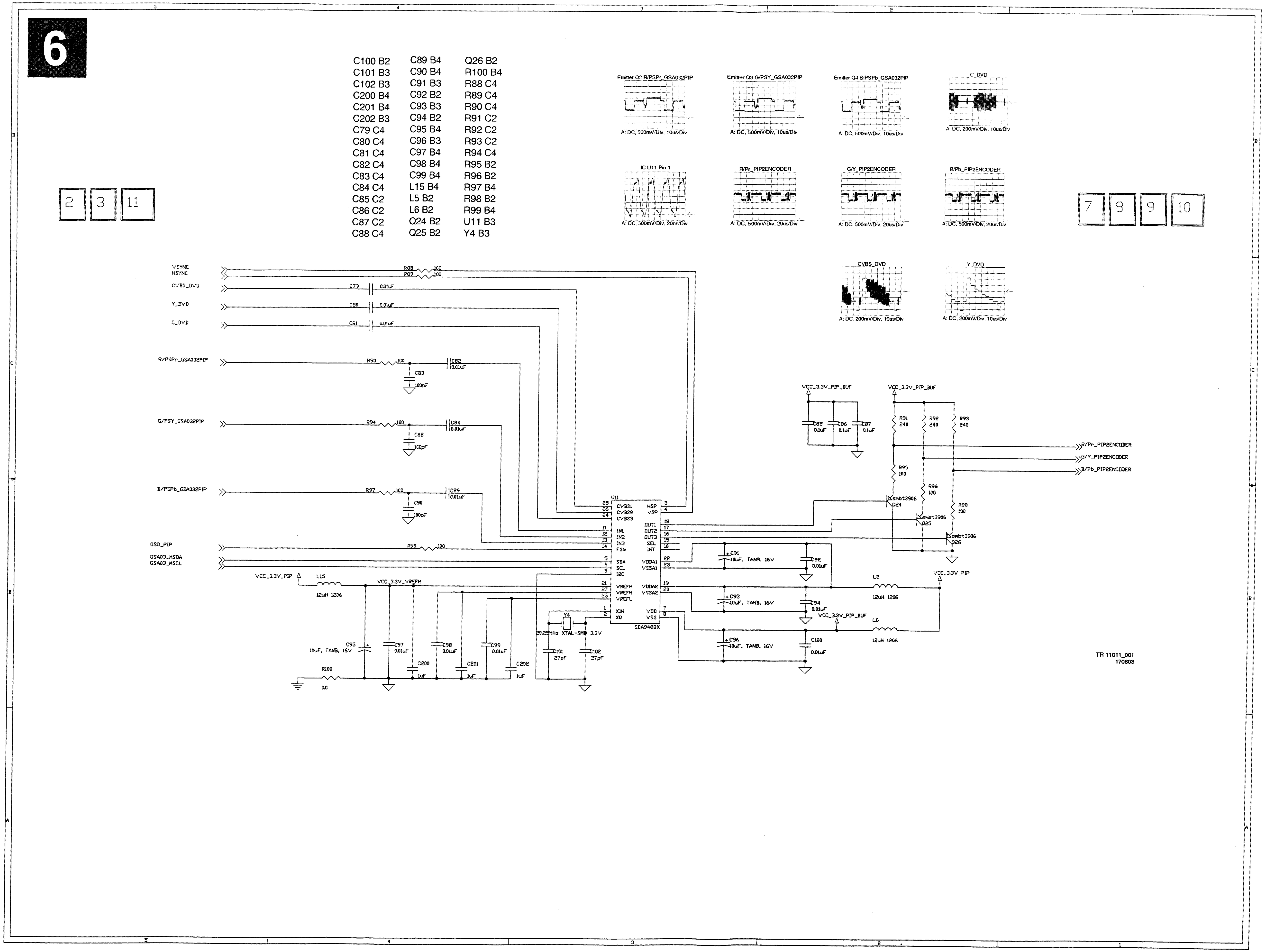
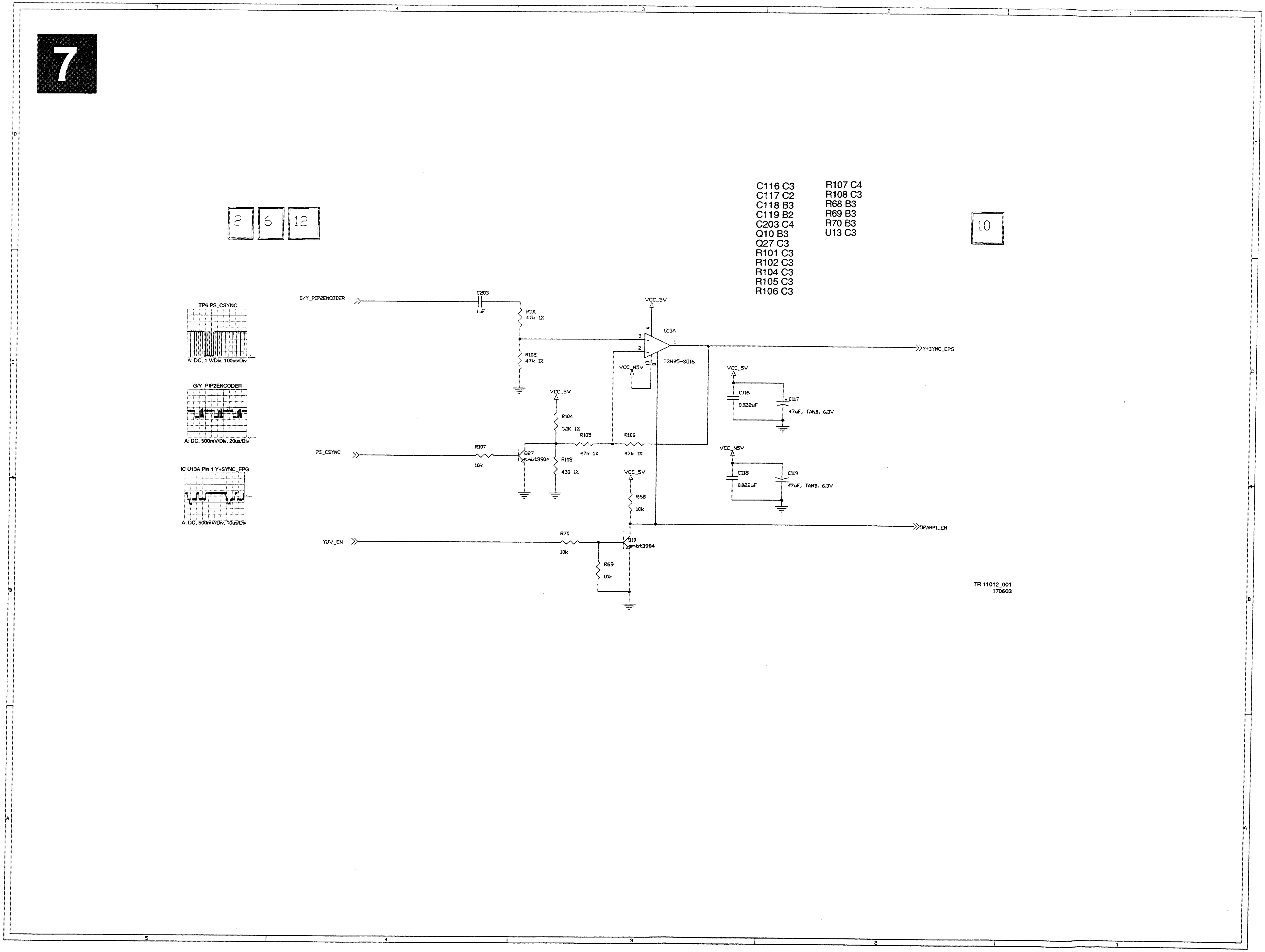
EPG Board: PIP Controller



C100	B2	C89	B4	Q26	B2
C101	B3	C90	B4	R100	B4
C102	B3	C91	B3	R88	C4
C200	B4	C92	B2	R89	C4
C201	B4	C93	B3	R90	C4
C202	B3	C94	B2	R91	C2
C79	C4	C95	B4	R92	C2
C80	C4	C96	B3	R93	C2
C81	C4	C97	B4	R94	C4
C82	C4	C98	B4	R95	B2
C83	C4	C99	B4	R96	B2
C84	C4	L15	B4	R97	B4
C85	C2	L5	B2	R98	B2
C86	C2	L6	B2	R99	B4
C87	C2	Q24	B2	U11	B3
C88	C4	Q25	B2	Y4	B3

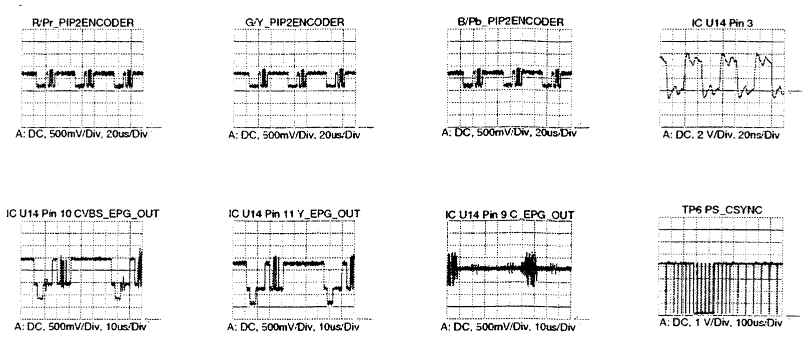
6
2
3
11
7
8
9
10
Emitter Q2 R/PSPr_GSA032PIP
A: DC, 500mV/Div, 10us/Div
Emitter Q3 G/PSY_GSA032PIP
A: DC, 500mV/Div, 10us/Div
Emitter Q4 B/PSPb_GSA032PIP
A: DC, 500mV/Div, 10us/Div
C_DVD
A: DC, 200mV/Div, 10us/Div
IC U11 Pin 1
A: DC, 500mV/Div, 20ns/Div
R/Pr_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
G/Y_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
B/Pb_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
CVBS_DVD
A: DC, 200mV/Div, 10us/Div
Y_DVD
A: DC, 200mV/Div, 10us/Div
VSYNC
HSYNC
CVBS_DVD
Y_DVD
C_DVD
R/PSPr_GSA032PIP
G/PSY_GSA032PIP
B/PSPb_GSA032PIP
OSD_PIP
GSA03_MSDA
GSA03_MSCL
R88 100
R89 100
C79 0.01uF
C80 0.01uF
C81 0.01uF
R90 100
C82 0.01uF
C83 100pF
R94 100
C84 0.01uF
C88 100pF
R97 100
C89 0.01uF
C90 100pF
R99 100
VCC_3.3V_PIP
L15 12uH 1206
VCC_3.3V_VREFH
C95 10uF, TANB, 16V
C97 0.01uF
C200 1uF
C98 0.01uF
C201 1uF
C99 0.01uF
C202 1uF
R100 0.0
Y4
20.25MHz XTAL-SMD 3.3V
C101 27pF
C102 27pF
U11
28 CVBS1
26 CVBS2
24 CVBS3
11 IN1
12 IN2
13 IN3
14 FSW
5 SDA
6 SCL
9 I2C
21 VREFH
27 VREFM
25 VREFL
1 XIN
2 XQ
HSP 3
VSP 4
OUT1 18
OUT2 17
OUT3 16
SEL 15
INT 10
VDDA1 22
VSSA1 23
VDDA2 19
VSSA2 20
VDD 7
VSS 8
SDA9488X
C91 10uF, TANB, 16V
C92 0.01uF
C93 10uF, TANB, 16V
C94 0.01uF
C96 10uF, TANB, 16V
C100 0.01uF
L5 12uH 1206
L6 12uH 1206
VCC_3.3V_PIP
VCC_3.3V_PIP_BUF
VCC_3.3V_PIP_BUF
C85 0.1uF
C86 0.1uF
C87 0.1uF
VCC_3.3V_PIP_BUF
R91 240
R92 240
R93 240
R95 100
R96 100
R98 100
smbt3906 Q24
smbt3906 Q25
smbt3906 Q26
R/Pr_PIP2ENCODER
G/Y_PIP2ENCODER
B/Pb_PIP2ENCODER
TR 11011_001
170603

EPG Board: Sync Adder for Y


7
2
6
12
10
C116 C3
C117 C2
C118 B3
C119 B2
C203 C4
Q10 B3
Q27 C3
R101 C3
R102 C3
R104 C3
R105 C3
R106 C3
R107 C4
R108 C3
R68 B3
R69 B3
R70 B3
U13 C3
TP6 PS_CSYNC
A: DC, 1 V/Div, 100us/Div
G/Y_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
IC U13A Pin 1 Y+SYNC_EPG
A: DC, 500mV/Div, 10us/Div
G/Y_PIP2ENCODER
C203
1uF
R101
47k 1%
R102
47k 1%
VCC_5V
U13A
3
2
1
13
8
TSH95-SD16
VCC_N5V
Y+SYNC_EPG
VCC_5V
C116
0.022uF
C117
47uF, TANB, 6.3V
VCC_N5V
C118
0.022uF
C119
47uF, TANB, 6.3V
VCC_5V
R104
5.1K 1%
R105
47k 1%
R106
47k 1%
PS_CSYNC
R107
10k
Q27
smbt3904
R108
430 1%
VCC_5V
R68
10k
OPAMP1_EN
YUV_EN
R70
10k
Q10
smbt3904
R69
10k
TR 11012_001
170603
5
4
3
2
1
D
C
B
A

EPG Board: Colour Encoder

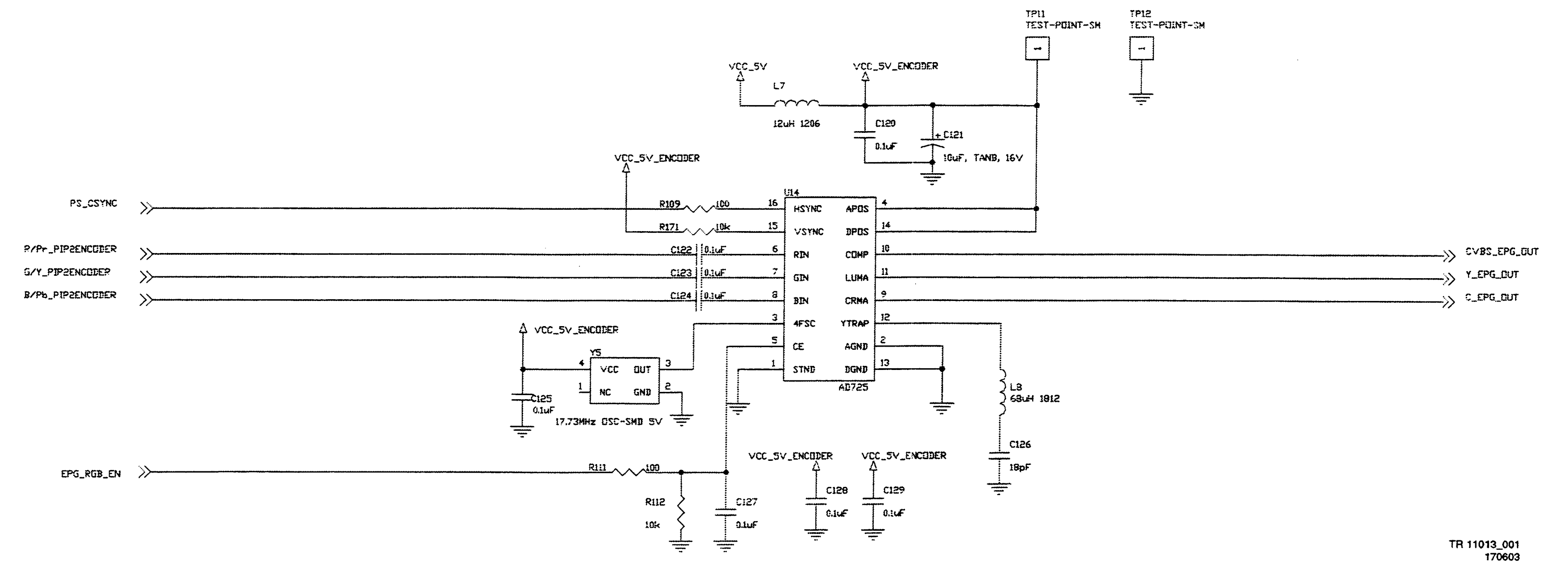
8



C120	C3
C121	C3
C122	C3
C123	C3
C124	B3
C125	B4
C126	B3
C127	B3
C128	B3
C129	B3
L7	C3
L8	B3
R109	C3
R111	B3
R112	B3
R171	C3
TP11	C3
TP12	C2
U14	C3
Y5	B3

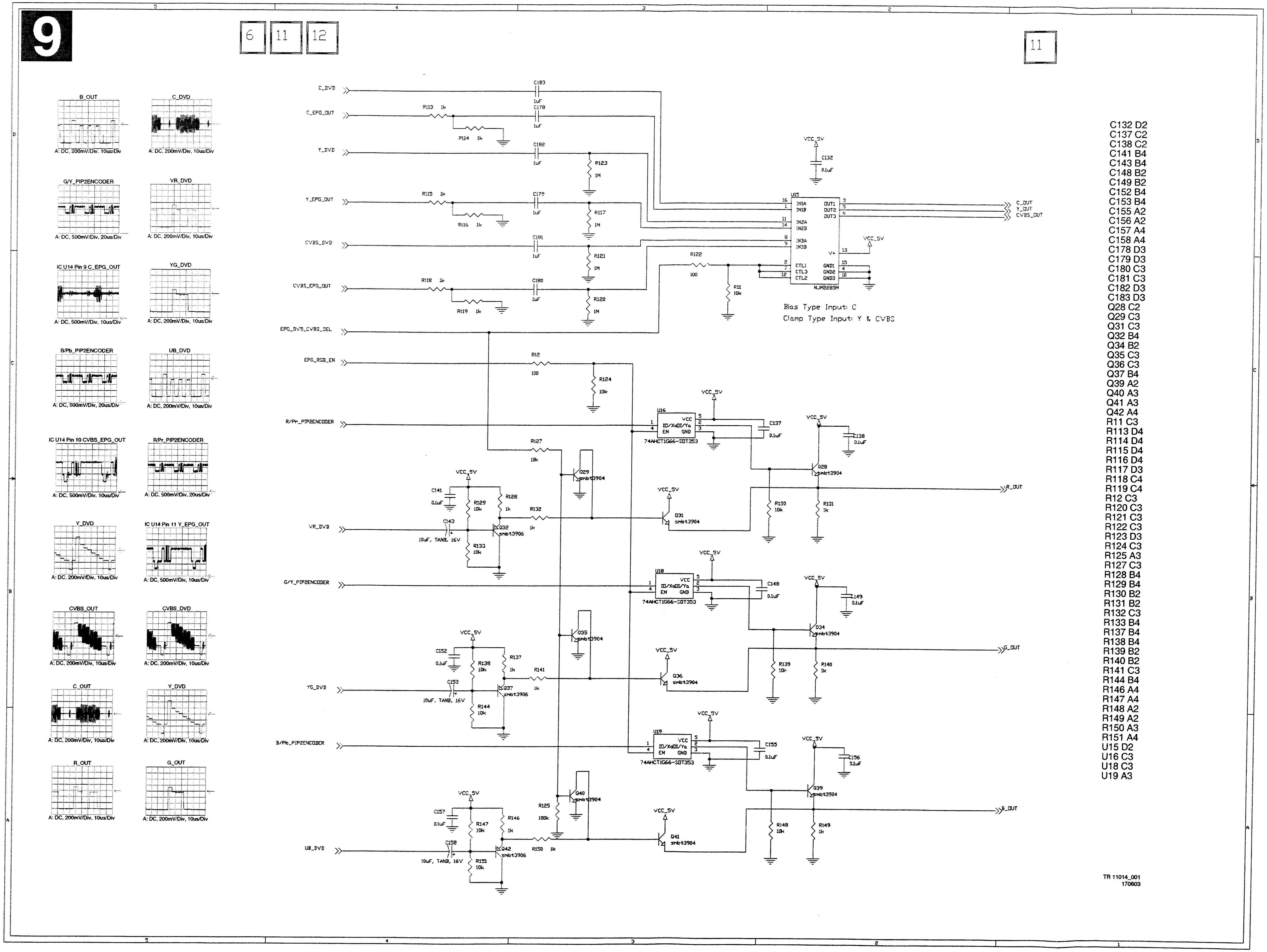
4 6 12

11


TP11
TEST-POINT-SM
TP12
TEST-POINT-SM
VCC_5V
L7
12uH 1206
VCC_5V_ENCODER
C120
0.1uF
C121
10uF, TANB, 16V
VCC_5V_ENCODER
U14
PS_CSYNC
R109
100
R171
10k
R/Pr_PIP2ENCODER
G/Y_PIP2ENCODER
B/Pb_PIP2ENCODER
C122
0.1uF
C123
0.1uF
C124
0.1uF
16 HSYNC
15 VSYNC
6 RIN
7 GIN
8 BIN
3 4FSC
5 CE
1 STND
APOS 4
DPOS 14
COMP 10
LUMA 11
CRMA 9
YTRAP 12
AGND 2
DGND 13
AD725
CVBS_EPG_OUT
Y_EPG_OUT
C_EPG_OUT
VCC_5V_ENCODER
Y5
VCC
OUT
NC
GND
C125
0.1uF
17.73MHz OSC-SMD 5V
L8
68uH 1812
C126
18pF
EPG_RGB_EN
R111
100
R112
10k
C127
0.1uF
VCC_5V_ENCODER
C128
0.1uF
VCC_5V_ENCODER
C129
0.1uF

TR 11013_001
170603

EPG Board: Analogue Switches for CVBS, Y, C, RGB


9
6
11
12
11
B_OUT
A: DC, 200mV/Div, 10us/Div
C_DVD
A: DC, 200mV/Div, 10us/Div
G/Y_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
VR_DVD
A: DC, 200mV/Div, 10us/Div
IC U14 Pin 9 C_EPG_OUT
A: DC, 500mV/Div, 10us/Div
YG_DVD
A: DC, 200mV/Div, 10us/Div
B/Pb_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
UB_DVD
A: DC, 200mV/Div, 10us/Div
IC U14 Pin 10 CVBS_EPG_OUT
A: DC, 500mV/Div, 10us/Div
R/Pr_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
Y_DVD
A: DC, 200mV/Div, 10us/Div
IC U14 Pin 11 Y_EPG_OUT
A: DC, 500mV/Div, 10us/Div
CVBS_OUT
A: DC, 200mV/Div, 10us/Div
CVBS_DVD
A: DC, 200mV/Div, 10us/Div
C_OUT
A: DC, 200mV/Div, 10us/Div
Y_DVD
A: DC, 200mV/Div, 10us/Div
R_OUT
A: DC, 200mV/Div, 10us/Div
G_OUT
A: DC, 200mV/Div, 10us/Div
C_DVD
C_EPG_OUT
Y_DVD
Y_EPG_OUT
CVBS_DVD
CVBS_EPG_OUT
EPG_DVD_CVBS_SEL
EPG_RGB_EN
R/Pr_PIP2ENCODER
VR_DVD
G/Y_PIP2ENCODER
YG_DVD
B/Pb_PIP2ENCODER
UB_DVD
C183 1uF
C178 1uF
C182 1uF
C179 1uF
C191 1uF
C180 1uF
R113 1k
R114 1k
R115 1k
R116 1k
R118 1k
R119 1k
R123 1M
R117 1M
R121 1M
R120 1M
R122 100
R11 10k
R12 100
R124 10k
VCC_5V
C132 0.1uF
U15
IN1A
IN1B
IN2A
IN2B
IN3A
IN3B
CTL1
CTL3
CTL2
OUT1
OUT2
OUT3
V+
GND1
GND2
GND3
NJM2285M
C_OUT
Y_OUT
CVBS_OUT
Bias Type Input: C
Clamp Type Input: Y & CVBS
U16
U18
U19
VCC
I0/XaOI/Ya
EN
GND
74AHCT1G66-SOT353
C137 0.1uF
C138 0.1uF
C148 0.1uF
C149 0.1uF
C155 0.1uF
C156 0.1uF
Q28 smbt3904
Q29 smbt3904
Q31 smbt3904
Q32 smbt3906
Q34 smbt3904
Q35 smbt3904
Q36 smbt3904
Q37 smbt3906
Q39 smbt3904
Q40 smbt3904
Q41 smbt3904
Q42 smbt3906
R127 10k
R125 100k
C141 0.1uF
C143 10uF, TANB, 16V
C152 0.1uF
C153 10uF, TANB, 16V
C157 0.1uF
C158 10uF, TANB, 16V
R129 10k
R128 1k
R132 1k
R133 10k
R138 10k
R137 1k
R141 1k
R144 10k
R147 10k
R146 1k
R150 1k
R151 10k
R130 10k
R131 1k
R139 10k
R140 1k
R148 10k
R149 1k
R_OUT
G_OUT
B_OUT
TR 11014_001
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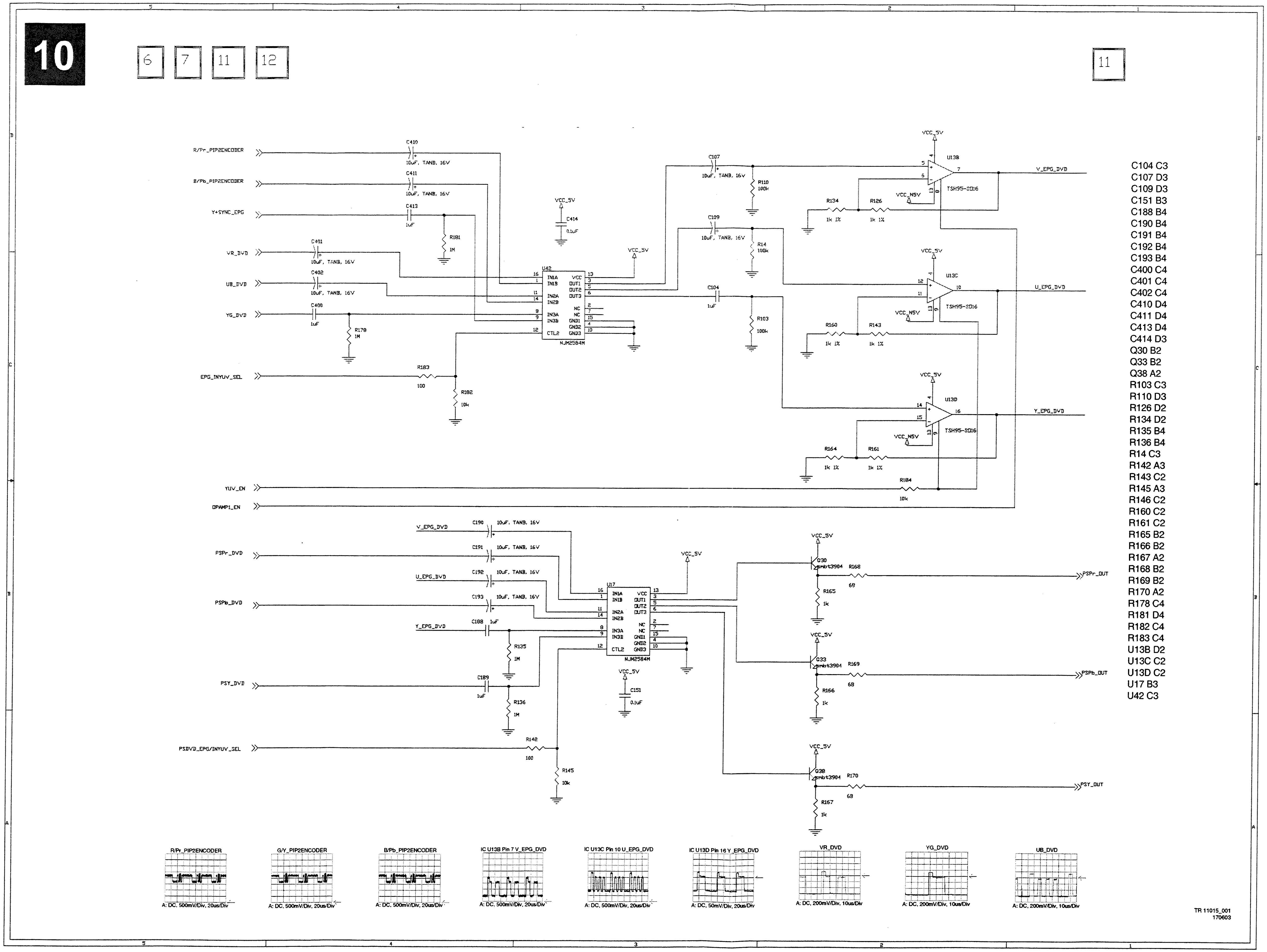
C132	D2
C137	C2
C138	C2
C141	B4
C143	B4
C148	B2
C149	B2
C152	B4
C153	B4
C155	A2
C156	A2
C157	A4
C158	A4
C178	D3
C179	D3
C180	C3
C181	C3
C182	D3
C183	D3
Q28	C2
Q29	C3
Q31	C3
Q32	B4
Q34	B2
Q35	C3
Q36	C3
Q37	B4
Q39	A2
Q40	A3
Q41	A3
Q42	A4
R11	C3
R113	D4
R114	D4
R115	D4
R116	D4
R117	D3
R118	C4
R119	C4
R12	C3
R120	C3
R121	C3
R122	C3
R123	D3
R124	C3
R125	A3
R127	C3
R128	B4
R129	B4
R130	B2
R131	B2
R132	C3
R133	B4
R137	B4
R138	B4
R139	B2
R140	B2
R141	C3
R144	B4
R146	A4
R147	A4
R148	A2
R149	A2
R150	A3
R151	A4
U15	D2
U16	C3
U18	C3
U19	A3

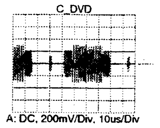
EPG Board: Analogue Switches for YUV, YPbPr


10
6
7
11
12
11
R/Pr_PIP2ENCODER
B/Pb_PIP2ENCODER
Y+SYNC_EPG
VR_DVD
UB_DVD
YG_DVD
EPG_INYUV_SEL
YUV_EN
OPAMP1_EN
C410 10uF, TANB, 16V
C411 10uF, TANB, 16V
C413 1uF
C401 10uF, TANB, 16V
C402 10uF, TANB, 16V
C400 1uF
R181 1M
R178 1M
R183 100
R182 10k
VCC_5V
C414 0.1uF
U42
NJM2584M
IN1A
IN1B
IN2A
IN2B
IN3A
IN3B
CTL2
VCC
OUT1
OUT2
OUT3
NC
GND1
GND2
GND3
C107 10uF, TANB, 16V
C109 10uF, TANB, 16V
C104 1uF
R110 100k
R14 100k
R103 100k
U13B
U13C
U13D
TSH95-SO16
VCC_N5V
R134 1k 1%
R126 1k 1%
R160 1k 1%
R143 1k 1%
R164 1k 1%
R161 1k 1%
R184 10k
V_EPG_DVD
U_EPG_DVD
Y_EPG_DVD
PSPr_DVD
PSPb_DVD
PSY_DVD
PSDVD_EPG/INYUV_SEL
C190 10uF, TANB, 16V
C191 10uF, TANB, 16V
C192 10uF, TANB, 16V
C193 10uF, TANB, 16V
C188 1uF
C189 1uF
R135 1M
R136 1M
R142 100
R145 10k
U17
C151 0.1uF
Q30 smbt3904
Q33 smbt3904
Q38 smbt3904
R168 68
R169 68
R170 68
R165 1k
R166 1k
R167 1k
PSPr_OUT
PSPb_OUT
PSY_OUT
C104 C3
C107 D3
C109 D3
C151 B3
C188 B4
C190 B4
C191 B4
C192 B4
C193 B4
C400 C4
C401 C4
C402 C4
C410 D4
C411 D4
C413 D4
C414 D3
Q30 B2
Q33 B2
Q38 A2
R103 C3
R110 D3
R126 D2
R134 D2
R135 B4
R136 B4
R14 C3
R142 A3
R143 C2
R145 A3
R146 C2
R160 C2
R161 C2
R165 B2
R166 B2
R167 A2
R168 B2
R169 B2
R170 A2
R178 C4
R181 D4
R182 C4
R183 C4
U13B D2
U13C C2
U13D C2
U17 B3
U42 C3
R/Pr_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
G/Y_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
B/Pb_PIP2ENCODER
A: DC, 500mV/Div, 20us/Div
IC U13B Pin 7 V_EPG_DVD
A: DC, 500mV/Div, 20us/Div
IC U13C Pin 10 U_EPG_DVD
A: DC, 500mV/Div, 20us/Div
IC U13D Pin 16 Y_EPG_DVD
A: DC, 50mV/Div, 20us/Div
VR_DVD
A: DC, 200mV/Div, 10us/Div
YG_DVD
A: DC, 200mV/Div, 10us/Div
UB_DVD
A: DC, 200mV/Div, 10us/Div
TR 11015_001
170603

EPG Board: Connectors

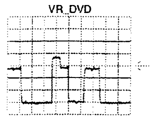
11

C_DVD



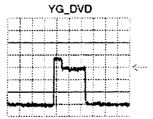
A: DC, 200mV/Div, 10us/Div

VR_DVD



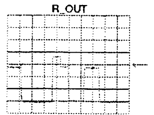
A: DC, 200mV/Div, 10us/Div

YG_DVD



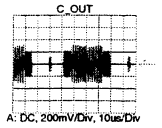
A: DC, 200mV/Div, 10us/Div

R_OUT



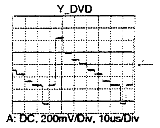
A: DC, 200mV/Div, 10us/Div

C_OUT



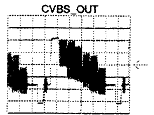
A: DC, 200mV/Div, 10us/Div

Y_DVD



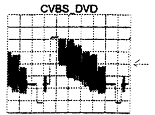
A: DC, 200mV/Div, 10us/Div

CVBS_OUT



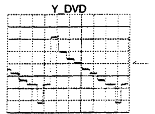
A: DC, 200mV/Div, 10us/Div

CVBS_DVD



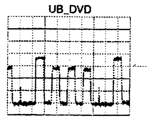
A: DC, 200mV/Div, 10us/Div

Y_DVD



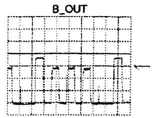
A: DC, 200mV/Div, 10us/Div

UB_DVD



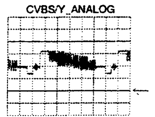
A: DC, 200mV/Div, 10us/Div

B_OUT



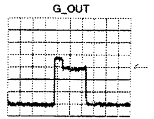
A: DC, 200mV/Div, 10us/Div

CVBS/Y_ANALOG

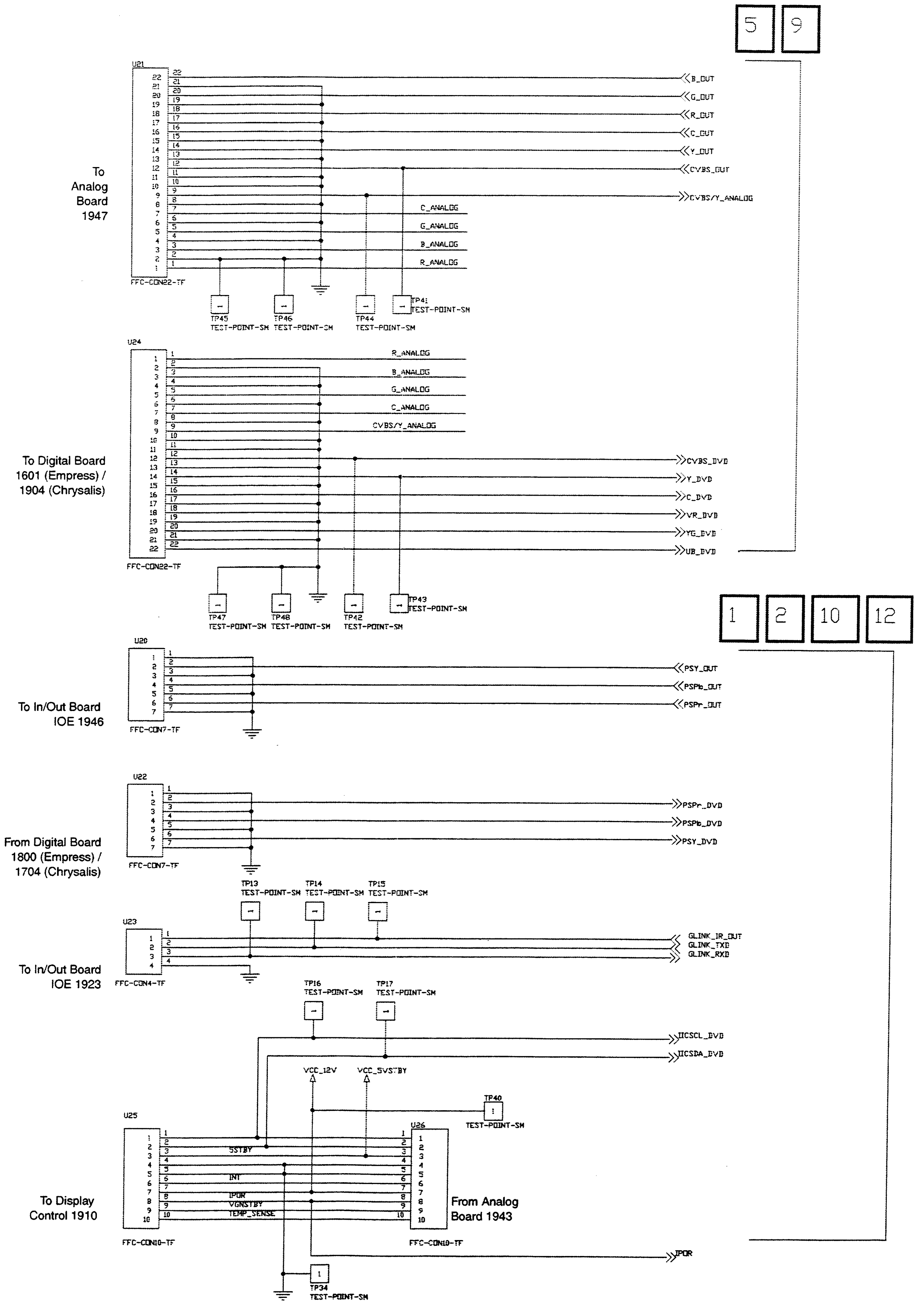


A: DC, 500mV/Div, 10us/Div

G_OUT



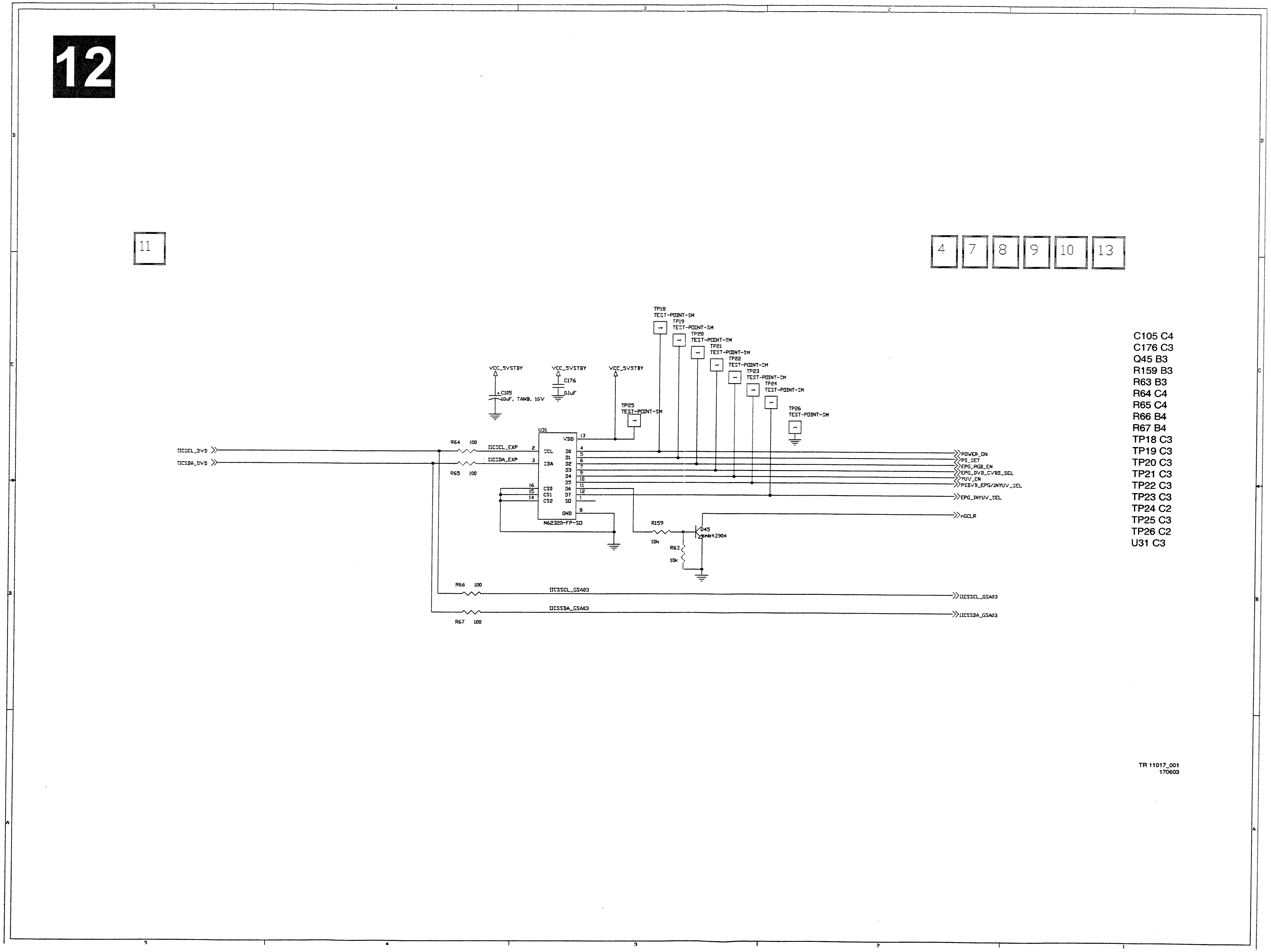
A: DC, 200mV/Div, 10us/Div


5
9
U21
FFC-CON22-TF
To
Analog
Board
1947
B_OUT
G_OUT
R_OUT
C_OUT
Y_OUT
CVBS_OUT
CVBS/Y_ANALOG
C_ANALOG
G_ANALOG
B_ANALOG
R_ANALOG
TP45
TEST-POINT-SM
TP46
TEST-POINT-SM
TP44
TEST-POINT-SM
TP41
TEST-POINT-SM
U24
FFC-CON22-TF
To Digital Board
1601 (Empress) /
1904 (Chrysalis)
R_ANALOG
B_ANALOG
G_ANALOG
C_ANALOG
CVBS/Y_ANALOG
CVBS_DVD
Y_DVD
C_DVD
VR_DVD
YG_DVD
UB_DVD
TP47
TEST-POINT-SM
TP48
TEST-POINT-SM
TP42
TEST-POINT-SM
TP43
TEST-POINT-SM
1
2
10
12
U20
FFC-CON7-TF
To In/Out Board
IOE 1946
PSY_OUT
PSPb_OUT
PSPr_OUT
U22
FFC-CON7-TF
From Digital Board
1800 (Empress) /
1704 (Chrysalis)
PSPr_DVD
PSPb_DVD
PSY_DVD
TP13
TEST-POINT-SM
TP14
TEST-POINT-SM
TP15
TEST-POINT-SM
U23
FFC-CON4-TF
To In/Out Board
IOE 1923
GLINK_IR_OUT
GLINK_TXD
GLINK_RXD
TP16
TEST-POINT-SM
TP17
TEST-POINT-SM
IICSCL_DVD
IICSDA_DVD
VCC_12V
VCC_5VSTBY
TP40
TEST-POINT-SM
U25
FFC-CON10-TF
To Display
Control 1910
5STBY
INT
IPOR
VGNSTBY
TEMP_SENSE
U26
FFC-CON10-TF
From Analog
Board 1943
IPOR
TP34
TEST-POINT-SM

TP13	B3
TP14	B3
TP15	B3
TP16	A3
TP17	A3
TP34	A3
TP40	A2
TP41	D3
TP42	C3
TP43	C3
TP44	D3
TP45	D3
TP46	D3
TP47	C3
TP48	C3
U20	B3
U21	D3
U22	B3
U23	B3
U24	C3
U25	A3
U26	A3

TR 11016_001
120603

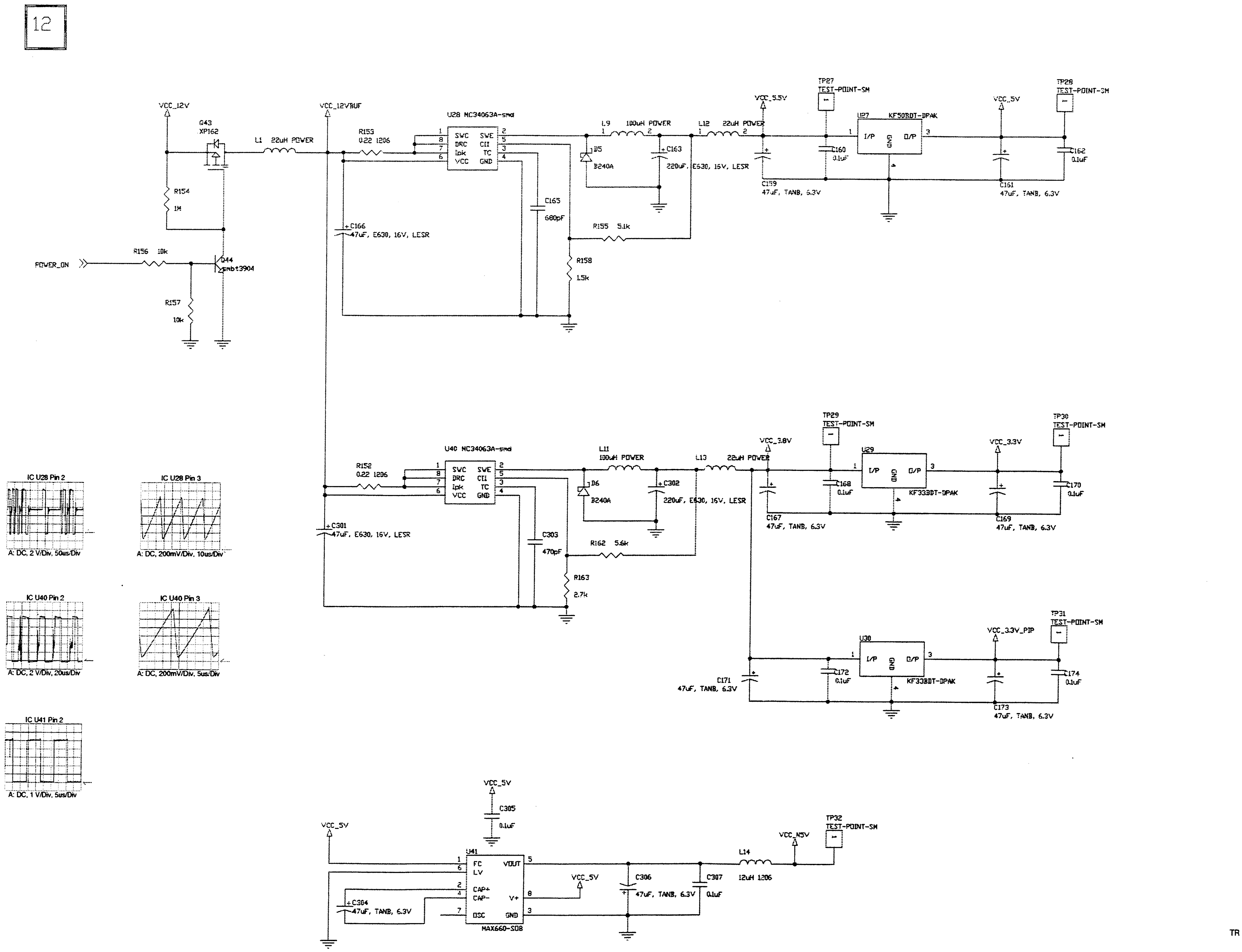
EPG Board: IIC Expander


12
11
4
7
8
9
10
13
VCC_5VSTBY
C105
10uF, TANB, 16V
C176
0.1uF
TP18
TEST-POINT-SM
TP19
TEST-POINT-SM
TP20
TEST-POINT-SM
TP21
TEST-POINT-SM
TP22
TEST-POINT-SM
TP23
TEST-POINT-SM
TP24
TEST-POINT-SM
TP25
TEST-POINT-SM
TP26
TEST-POINT-SM
U31
M62320-FP-SD
VDD
SCL
SDA
CS0
CS1
CS2
D0
D1
D2
D3
D4
D5
D6
D7
SO
GND
IICSCL_DVD
IICSDA_DVD
R64 100
R65 100
IICSCL_EXP
IICSDA_EXP
R66 100
R67 100
IICSSCL_GSA03
IICSSDA_GSA03
R159
10k
R63
10k
Q45
smbt3904
POWER_ON
PS_SET
EPG_RGB_EN
EPG_DVD_CVBS_SEL
YUV_EN
PSDVD_EPG/INYUV_SEL
EPG_INYUV_SEL
nGCLR
TR 11017_001
170603

C105	C4
C176	C3
Q45	B3
R159	B3
R63	B3
R64	C4
R65	C4
R66	B4
R67	B4
TP18	C3
TP19	C3
TP20	C3
TP21	C3
TP22	C3
TP23	C3
TP24	C2
TP25	C3
TP26	C2
U31	C3

EPG Board: Power Conversion

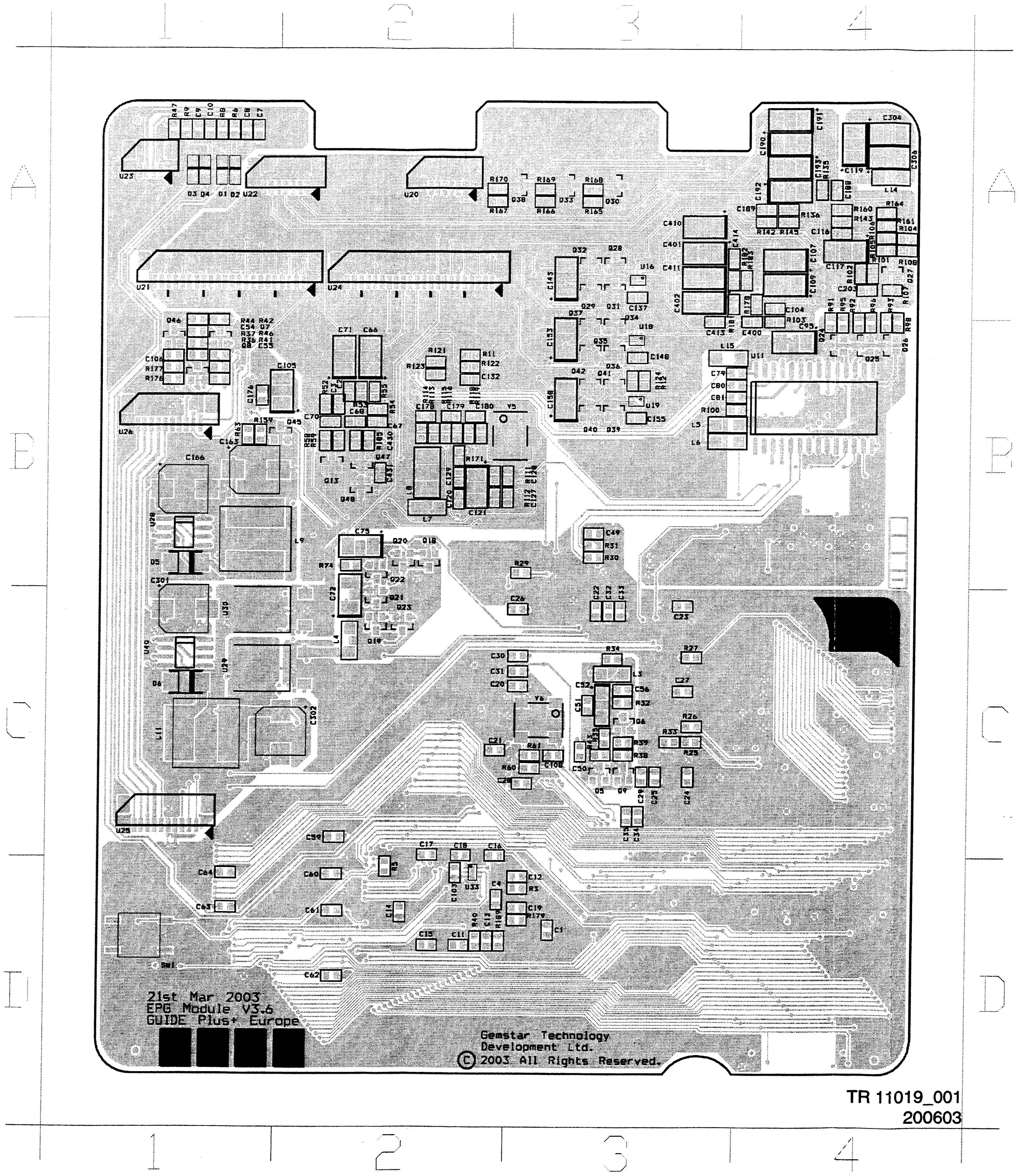
13


12
VCC_12V
Q43
XP162
L1 22uH POWER
VCC_12VBUF
R153
0.22 1206
U28 MC34063A-smd
SWC
DRC
Ipk
VCC
SWE
CII
TC
GND
L9 100uH POWER
L12 22uH POWER
VCC_5.5V
TP27
TEST-POINT-SM
U27 KF50BDT-DPAK
I/P
GND
O/P
VCC_5V
TP28
TEST-POINT-SM
C160
0.1uF
C162
0.1uF
C159
47uF, TANB, 6.3V
C161
47uF, TANB, 6.3V
D5
B240A
C163
220uF, E630, 16V, LESR
C165
680pF
C166
47uF, E630, 16V, LESR
R154
1M
R155 5.1k
R158
1.5k
POWER_ON
R156 10k
Q44
smbt3904
R157
10k
TP29
TEST-POINT-SM
TP30
TEST-POINT-SM
VCC_3.8V
VCC_3.3V
U40 MC34063A-smd
L11
100uH POWER
L13 22uH POWER
U29
KF33BDT-DPAK
R152
0.22 1206
D6
B240A
C302
220uF, E630, 16V, LESR
C168
0.1uF
C170
0.1uF
C167
47uF, TANB, 6.3V
C169
47uF, TANB, 6.3V
C301
47uF, E630, 16V, LESR
C303
470pF
R162 5.6k
R163
2.7k
IC U28 Pin 2
A: DC, 2 V/Div, 50us/Div
IC U28 Pin 3
A: DC, 200mV/Div, 10us/Div
IC U40 Pin 2
A: DC, 2 V/Div, 20us/Div
IC U40 Pin 3
A: DC, 200mV/Div, 5us/Div
IC U41 Pin 2
A: DC, 1 V/Div, 5us/Div
TP31
TEST-POINT-SM
VCC_3.3V_PIP
U30
KF33BDT-DPAK
C171
47uF, TANB, 6.3V
C172
0.1uF
C173
47uF, TANB, 6.3V
C174
0.1uF
VCC_5V
C305
0.1uF
VCC_5V
U41
FC
LV
CAP+
CAP-
OSC
VOUT
V+
GND
MAX660-SO8
C304
47uF, TANB, 6.3V
VCC_5V
C306
47uF, TANB, 6.3V
C307
0.1uF
L14
12uH 1206
VCC_N5V
TP32
TEST-POINT-SM

C159	D3
C160	D2
C161	D2
C162	D2
C163	D3
C165	C3
C166	C4
C167	C3
C168	C2
C169	C2
C170	C2
C171	B3
C172	B2
C173	B2
C174	B2
C301	B4
C302	C3
C303	B3
C304	A4
C305	B3
C306	A3
C307	A3
D5	D3
D6	C3
L1	D4
L11	C3
L12	D3
L13	C3
L14	A3
L9	D3
Q43	D4
Q44	C4
R152	C4
R153	D4
R154	C4
R155	C3
R156	C4
R157	C4
R158	C3
R162	B3
R163	B3
TP27	D2
TP28	D2
TP29	C2
TP30	C2
TP31	B2
TP32	A2
U27	D2
U28	D3
U29	C2
U30	B2
U40	C3
U41	A3

TR 11018_001
170603

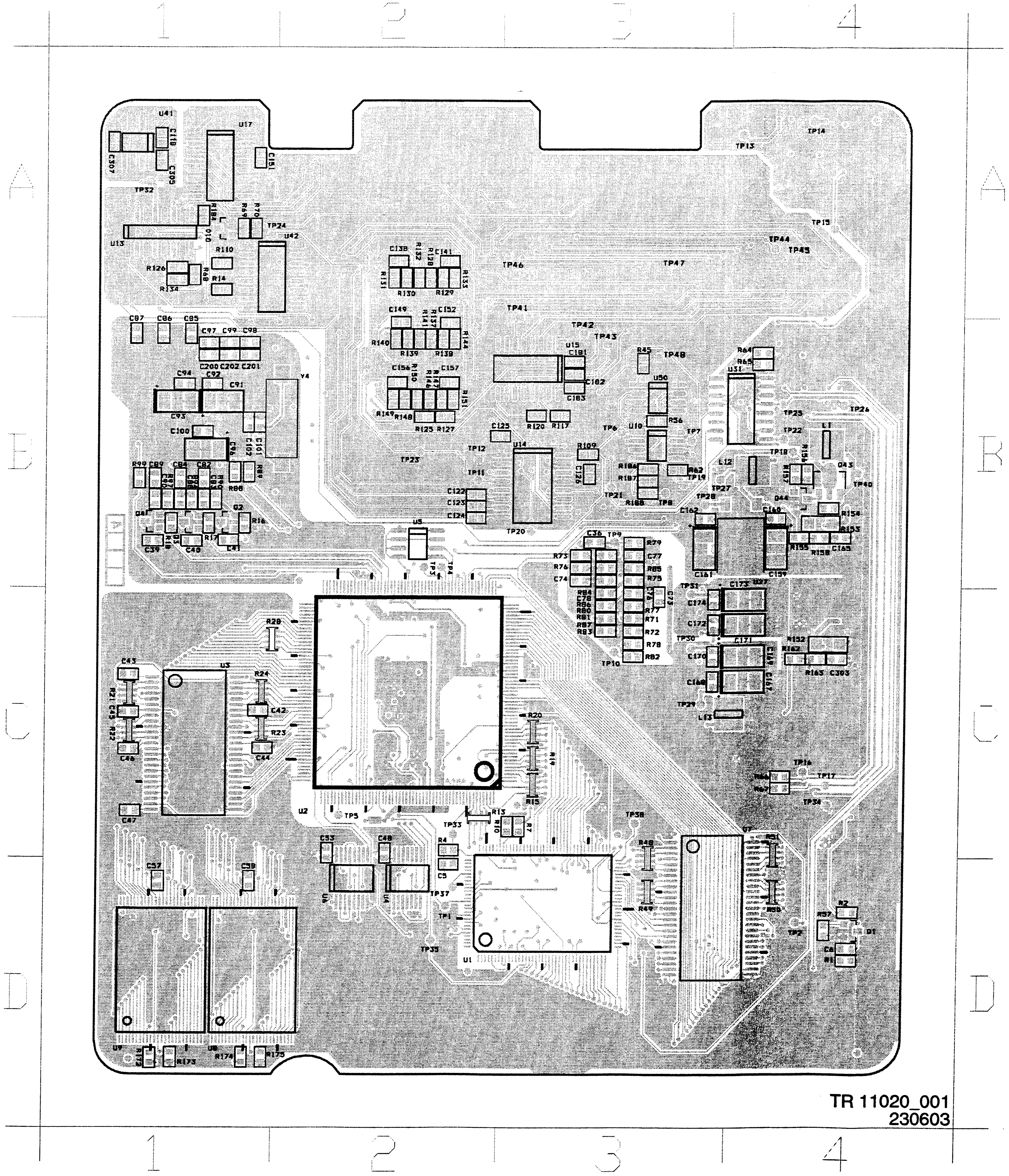
Layout EPG Board (Top View)



TR 11019_001
200603

C1	D3
C10	A1
C103	D2
C104	A4
C105	B1
C106	B1
C107	A4
C108	C3
C109	A4
C11	D2
C116	A4
C117	A4
C119	A4
C12	D3
C120	B2
C121	B2
C127	B2
C129	B2
C13	D2
C132	B2
C137	A3
C14	D2
C140	B3
C143	A3
C15	D2
C150	B3
C153	B3
C155	B3
C16	C2
C163	B1
C166	B1
C17	C2
C176	B1
C178	B2
C179	B2
C18	C2
C180	B2
C188	A4
C189	A4
C19	D3
C190	A4
C191	A4
C192	A4
C193	A4
C2	B2
C20	C3
C21	C2
C22	C3
C23	C3
C24	C3
C25	C3
C26	C3
C27	C3
C29	C3
C3	B2
C30	C3
C302	C1
C304	A4
C306	A4
C31	C3
C32	C3
C33	C3
C34	C3
C35	C3
C4	D2
C400	B4
C401	A3
C402	A3
C410	A3
C411	A3
C413	B3
C414	A3
C430	B2
C431	B2
C49	B3
C50	C3
C51	C3
C52	C3
C54	B1
C55	B1
C56	C3
C59	C2
C60	D2
C61	D2
C62	D2
C63	D1
C64	D1
C66	B2
C67	B2
C68	B2
C7	A1
C70	B2
C71	B2
C72	C2
C75	B2
C79	B3
C8	A1
C80	B3
C81	B3
C95	B4
D1	A1
D2	A1
D3	A1
D4	A1
D5	B1
D6	C1
L11	C1
L14	A4
L15	B3
L3	C3
L4	C2
L5	B3
L6	B3
L7	B2
L8	B2
L9	B1
Q13	B2
Q18	B2
Q19	C2
Q20	B2
Q20	A3
Q21	C2
Q22	B2
Q23	C2
Q24	B4
Q25	B4
Q26	B4
Q27	A4
Q29	A3
Q30	A3
Q31	A3
Q32	A3
Q33	A3
Q34	B3
Q35	B3
Q36	B3
Q37	B3
Q38	A3
Q39	B3
Q40	B3
Q40	B2
Q41	B3
Q42	B3
Q45	B1
Q46	B1
Q47	B2
Q5	C3
Q6	C3
Q7	B1
Q8	B1
Q9	C3
R100	B3
R101	A4
R102	A4
R103	B4
R104	A4
R105	A4
R106	A4
R108	A4
R11	B2
R111	B2
R112	B2
R113	B2
R114	B2
R115	B2
R116	B2
R118	B2
R119	B2
R12	B3
R121	B2
R122	B2
R123	B2
R124	B3
R135	A4
R136	A4
R142	A4
R143	A4
R145	A4
R159	B1
R160	A4
R161	A4
R164	A4
R165	A3
R166	A3
R169	A3
R170	A4
R170	A2
R171	B2
R176	B1
R177	B1
R179	D3
R181	A3
R182	A3
R183	A4
R185	B2
R189	D2
R25	C3
R26	C3
R27	C3
R29	B3
R3	D3
R30	B3
R31	B3
R32	C3
R33	C3
R34	C3
R35	C3
R36	B1
R37	B1
R38	C3
R39	C3
R40	D2
R41	B1
R42	B1
R43	C3
R44	B1
R46	B1
R47	A1
R5	D2
R52	B2
R53	B2
R54	B2
R55	B2
R58	B2
R59	B2
R6	A1
R60	C3
R61	C3
R63	B1
R74	B2
R8	A1
R9	A1
R91	B4
R92	B4
R93	B4
R95	B4
R96	B4
R98	B4
U11	B4
U16	A3
U18	B3
U19	B3
U20	B1
U20	A2
U21	A1
U22	A1
U23	A1
U24	A2
U25	C1
U26	B1
U29	C1
U30	C1
U33	D2
U40	C1
SW1	D1
Y5	B2
Y6	C3

Layout EPG Board (Bottom View)



C100	B1
C101	B1
C102	B1
C110	A1
C122	B2
C123	B2
C124	B2
C125	B2
C126	B3
C138	A2
C141	A2
C149	B2
C151	A1
C152	B2
C156	B2
C157	B2
C159	B4
C160	B4
C161	B3
C162	B3
C165	B4
C167	C4
C168	C3
C169	C4
C170	C3
C171	C4
C172	C3
C173	C4
C174	C3
C181	B3
C182	B3
C183	B3
C200	B1
C201	B1
C202	B1
C303	C4
C305	A1
C307	A1
C36	B3
C39	B1
C40	B1
C41	B1
C42	C1
C43	C1
C44	C1
C45	C1
C46	C1
C47	C1
C48	C2
C5	D2
C53	C2
C57	D1
C58	D1
C6	D4
C73	C3
C74	B3
C76	C3
C77	B3
C78	B3
C82	B1
C83	B1
C84	B1
C85	B1
C86	B1
C87	B1
C88	B1
C89	B1
C90	B1
C91	B1
C92	B1
C93	B1
C94	B1
C96	B1
C97	B1
C98	B1
C99	B1
L1	B4
L12	B4
L13	C3
Q1	D4
Q10	A1
Q2	B1
Q3	B1
Q4	B1
Q43	B4
Q44	B4
R1	D4
R10	C3
R104	A1
R109	B3
R110	A1
R117	B3
R120	B3
R125	B2
R126	A1
R127	B2
R128	A2
R129	A2
R13	C2
R130	A2
R131	A2
R132	A2
R133	A2
R134	A1
R137	B2
R138	B2
R139	B2
R14	A1
R140	B2
R141	B2
R144	B2
R146	B2
R147	B2
R148	B2
R149	B2
R15	C3
R150	B2
R151	B2
R152	C4
R153	B4
R154	B4
R155	B4
R156	B4
R157	B4
R158	B4
R16	B1
R162	C4
R163	C4
R17	B1
R172	D1
R173	D1
R174	D1
R175	D1
R18	B1
R186	B3
R187	B3
R188	B3
R19	C3
R2	D4
R20	C3
R21	C1
R22	C1
R23	C1
R24	C1
R28	C1
R4	C2
R45	B3
R48	D3
R49	D3
R50	D4
R51	C4
R56	B3
R57	D4
R62	B3
R64	B4
R65	B4
R66	C4
R67	C4
R68	A1
R69	A1
R7	C3
R70	A1
R71	C3
R72	C3
R73	B3
R75	B3
R76	B3
R77	C3
R78	C3
R79	B3
R80	C3
R81	C3
R82	C3
R83	C3
R84	B3
R85	B3
R86	B3
R87	C3
R88	B1
R89	B1
R90	B1
R94	B1
R97	B1
R99	B1
U1	D3
U10	B3
U13	A1
U14	B3
U15	B3
U17	A1
U2	C2
U27	B4
U3	C1
U31	B4
U4	D2
U41	A1
U42	A1
U5	B2
U50	B3
U6	D2
U7	D3
U8	D1
U9	D1
TP1	D2
TP10	C3
TP11	B2
TP12	B2
TP13	A4
TP14	A4
TP15	A4
TP16	C4
TP17	C4
TP18	B4
TP19	B3
TP2	D4
TP20	B3
TP21	B3
TP22	B4
TP23	B2
TP24	A1
TP25	B4
TP26	B4
TP27	B3
TP28	B3
TP29	C3
TP3	B2
TP30	C3
TP31	C3
TP32	A1
TP33	C2
TP34	C4
TP35	D2
TP37	D2
TP38	C3
TP4	B2
TP40	B4
TP41	A3
TP42	B3
TP43	B3
TP44	A4
TP45	A4
TP46	A3
TP47	A3
TP48	B3
TP5	C2
TP6	B3
TP7	B3
TP8	B3
TP9	B3

8. Alignments

8.1 Alignment Instructions Analog Board

Test equipment:

1. Dual-trace oscilloscope
   Voltage range : 0.001 ~ 50 V/div
   Frequency : DC ~ 50 MHz
   Probe : 10:1, 1:1

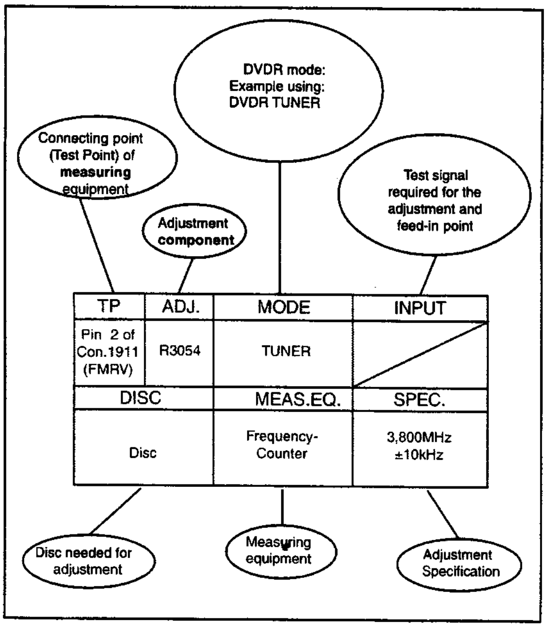
2. DVM (Digital voltmeter)

3. Frequency counter

4. Sinus generator
   Sinus : 0 ~ 50 MHz

5. Test pattern generator

How to read the adjustment procedures:


DVDR mode: Example using: DVDR TUNER
Connecting point (Test Point) of measuring equipment
Adjustment component
Test signal required for the adjustment and feed-in point
TP
ADJ.
MODE
INPUT
Pin 2 of Con.1911 (FMRV)
R3054
TUNER
DISC
MEAS.EQ.
SPEC.
Disc
Frequency-Counter
3,800MHz ±10kHz
Disc needed for adjustment
Measuring equipment
Adjustment Specification

Front End (FV)

Service tasks after replacement of IC 7710, coil L5710 and L5711:

1 AFC Adjustment:

Purpose: Correct adjustment of demodulator AFC - circuit
Symptom, if incorrectly set:
Bad or disturbed TV channel reception.

PAL - AFC adjustment [5711]:

TP	ADJ.	MODE	INPUT
IC 7710 Pin 17 (F708)	L5711	TUNER	38,9MHz $500mV_{pp}$ at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,1V

Storage in NVRAM via command mode interface of DSW:
After adjustment, the AFC reference value has to be stored in the NVRAM.
This reference value is 256 * measured voltage/Ucc. Ucc is 5.0V.
Store the reference value via command 732 , followed by the ref. value.
Example: DD:> 732 128

2 HF - AGC adjustment [3724]:

Service tasks after replacement of IC 7710:

Purpose: Set amplifier control.

Symptom, if incorrectly set:
Picture jitter if input level is too low and picture distortion if input level is too high.

TP	ADJ.	MODE	INPUT
Tuner 1705 Pin 11 (F710, IF-out)	R3707	Set tuned to channel 25 503.25 MHz	5mV(74dBµV) on aerial input PAL white picture, audio IF on, no modulation
DISC		MEAS.EQ.	SPEC.
		Oscilloscope Video Pattern Generator	$500mV_{pp}$ +/-0.5dB (use a 10:1 probe)

3 Attenuating the 40.4 MHz [5710]: (SECAM only)

Service tasks after replacement of coil 5710:

Purpose: To attenuate the band I carrier rests.

Symptom, if incorrectly set:
Bad picture quality when the filter attenuates the picture carrier (38.9MHz).

TP	ADJ.	MODE	INPUT
OFW 1701 Pin 1 (F709)	L5710	TUNER	40.4 MHz, $200mV_{rms}$ at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		Oscilloscope, Sinus Generator, Counter	adjust minimum amplitude

If the adjustment is correct the signal at pin 1 of OFW [1701] must be smaller than the input signal amplitude by at least 6 dB.

Figure 8-1

8.2 Reprogramming Procedure of NVM on the Microprocessor Sub PCB

The NVM, item 7808, on the Microprocessor Sub board contains the following factory settings:

1. Clock correction factor
2. AFC reference value
3. Slash version

The settings 1,2 and 3 are stored in the NVM during the production of the analogue board.
The slash version is stored at the end of the production line of the set.
In case of failure, the NVM must be replaced by an empty device. By way of commands via the Diagnostic Software or via ComPair, the factory settings must be restored in the NVM.

8.2.1 Clock Correction Adjustment

To guarantee an exact function of the real time clock, an adjustment of the clock frequency is possibe. The adjustment value is stored in the NVM.
Procedure:

- put the set in service command mode
- execute command 1117 to initiate that a signal with 32768 Hz is available on pin 3 of connector 1988
  example:
  DD:>1117
- measure the frequency fmeas of the Clock Crystal with an accuracy of 0.1 Hz.
- Calculate the parameter to be entered: 32768/fmeas * 106
- Normally the parameter must be between 999902 and 1000097. If the parameter and therefore the frequency of the crystal is outside this range, the crystal must be replaced.
- Execute command 1118 with the parameter as input
  example:
  DD:>1118 1000023

8.2.2 AFC Reference Voltage Tuner

This function stores the reference voltage for the tuner in the NVM. Before this value can be stored, the AFC adjustment, described in the adjustment instructions of the analogue board, must be carried out.
Procedure:

- Adjust AFC circuit
- Calculate the reference value
- Execute command 1119 and use the calculated reference value as parameter example: DD:>1119 128

8.2.3 Slash Version

The slash version is stored with command 1217, followed by the slash version as parameter.
The slash versions used in HDRW720 and HDRW725H are the following:

- /00/02: 74
- /05: 75

Example:
DD:>1217 74

Reset of Slash Version
Use command 1115 to reset the analogue board to the default setting.
Procedure:

- Put the set in DSW command mode
- Execute command 1115 with the following parameters:
  DD:> 1115 w 0xAE 2 0xD0 0x00
- Leave the DSW command mode and start up the set in application mode
  No background is visible on the TV screen. The analogue board is ready to accept the appropriate slash version

8.3 Rework Procedure IEEE Unique Number

8.3.1 Scope:

The procedure describes how to upgrade sets with a unique number after repair. This unique number is stored in the NVRAM (item 7809) of the digital board at the end of the production line.
This procedure is only valid or necessary when:

- The digital board is replaced
- NVRAM on the digital board is replaced
- NVRAM is cleared

In all other cases the repaired set retains its unique number.
The procedure defines several means to re-assure the unique number depending on the possibilities of repair or the state the faulty set is in.

8.3.2 Handling:

State of original (defective) board:

1. The digital board starts up in Diagnostics Mode: follow procedure A to retrieve the valid unique number
2. The digital board does NOT start up in Diagnostics Mode: follow procedure B.

8.3.3 Procedure A

1. Connect defective digital board to PC via serial cable (3122 785 90017)
2. start up hyper terminal or any other serial terminal via the correct settings (DSW command mode interface)
3. read out existing unique number via nucleus 1208
   example:
   DD:> 1208
   120800: DV Unique ID = 00D7A1FC6C Test OK @
4. note read out
5. program new digital board via nucleus 1207
   example:
   DD:> 1207 00D7A1FC6C 120700: Test OK @

The set has now the original unique number

8.3.4 Procedure B

1. Note the serial number of the set example:
   VN050136130156
   - VN = production centre (VN....Szekesfehervar).
     According to UAW-500: V=22 and N=14
   - 05 = change code (this is not used for this calculation)

- 01 = YEAR
- 36 = Production WEEK
- 130156 = Lot and SERIAL number

2. Calculate the unique number: this number always exists out of 10 hexadecimal numbers.
3. First 5 numbers: First we calculate a decimal number according to the formula below:
   35828*YEAR + 676* WEEK + 26*V + N+ 8788
   The figures are fixed, YEAR + WEEK + factory code (V+ N) are variable
   Example: 35828*01+676*36+26*22+14+8788 = 69538 (decimal)
   Then we translate the decimal number to a hexadecimal number. example: 69538 (decimal)= 10FA2 (hex)
4. Last 5 numbers: The last 5 numbers exist out of the Lot and SERIAL number according formula below:
   serial nr + 1 * 100000
   Example: 130156 + 100000 = 230156 (decimal)
   230156 (decimal) = 3830C (hex)
5. Program new digital board via nucleus or 1207. Therefore we use the 10 hexadecimal numbers we calculated above:
   example:
   ```
   >1207 10D7A3830C
   12700: Test OK @
   ```

The set has now its original unique number

8.4 Alignments after replacing the Boot EEPROM 7810

The NVM, item 7810, on the Digitalt Board Chrysalis contains the “Diversity String” that tells the software during startup which hardware version is present.
The setting is stored in the NVM during the production of the Digital Board Chrysalis
In case of a fault the NVM must be replaced by a programmed device containing the boot script.
Via the Diagnostic Software the Diversity String is stored with command 1226, followed by the Diversity String as parameter.

The diversity strings used in HDRW720/0x are the following:

ChrysalisString
Board
Type
CHRY F EF3_AV3 44424849179020014546335
F4156330034030300000101020001010040080800

Example:

```
DD:> 1226     44424849179020014546335F41
56330034030300000101020001010040080800

122600
Test OK @
```

With command 1228 the settings can be displayed.

9. Circuit-, IC descriptions and list of abbreviations

9.1 Display Board

9.1.1 Microcontroller

The core element of the Display Control unit is the microcontroller TMP87CH74AF [7110]. The TMP87CH74AF is an 8 bit microcontroller fitted with 32kB ROM and 1kB RAM. It requires 5V supply and is responsible for the following functions:

- Interface to Central Controller-P
- Evaluation of the keyboard matrix
- Decoding the remote control commands from the infra-red receiver
- Activation and control of the local display
- Heater voltage generation

The 8 MHz resonator (Pos. 1111) generates the system clock. The reset is generated by the CC-P via "POR_DC"-signal where the transistor [7106] is used as a level-shifter from 3V3 to 5V.

9.1.2 Interface to the Central Control µP

The communication to the main microcontroller (CC) on the P-Sub-PCB is done via I2C-Interface, where the TMP87CH74AF acts in slave-mode.
An additional wire ("INT"-line) is used to signal the Central controller that data are ready, e.g. when a key has been pressed.

9.1.3 Evaluation of the keyboard matrix

There are 12 different keys on the display board. A resistor network is used to generate a specific direct voltage value, depending on the pressed key. Via the resistors 3107 and 3102 on the analog/digital (A/D) ports (7103 pin 37 and 38) the evaluation is done.

9.1.4 IR receiver and signal evaluation

The IR receiver [7107] contains a selectively controlled amplifier as well as a photo-diode. The photo-diode changes the received infra red transmission (approx. 940nm) to electrical pulses, which are then amplified and demodulated. On the output of the IR receiver [7107], a pulse sequence with TTL-level, which corresponds to the envelope curve of the received IR remote control command, can be measured. This pulse sequence is fed into the controller for further processing via port TC1 [7103, pin20].

9.1.5 Vacuum Fluorescence Display

The VFD "BJ900GNK" [POS 7100] is fully controlled by the microcontroller. The µC also includes the driving stages. Only two additional drivers [POS 7101 and 7102] are necessary for the grids 8 and 9 because of their large size.

9.1.6 VFD Heater Voltage Generator

The circuit around POS [7106, 7108 and 7109] is used to generate a proper AC-Voltage for the filament of the VFD. For this the microcontroller generates an appropriate rectangular signal with 50% duty-cycle and a frequency of 30 kHz at pin 19. Pos. [5104] and [2113] are acting as a resonance-circuit. Via Zener-Diode (POS[6100]) and resistors [3119, 3122 and 3123] the two heater-pins of the VFD ("FIL1" and "FIL2") are clamped so that the grids and segments can be fully switched off.

9.1.7 REC-LED

The REC-LED-ring is made with 3 red LED, controlled via pin 3 (only for flashing) and pin 12 for on/off switching, of the microcontroller. The POS [7105] is used as a driver for the led.

9.1.8 EPG-LED

The EPG led is a white led and controlled from the pin 14 from the microcontroller. The POS [7110] is used as a driver for the led.

9.1.9 TRAY-LED

There are 6 leds (chip) necessary to illuminate the tray, these 6 leds are located on a little sub-pcb connected over a 4 pin connector POS [1911] from the DC-print. The leds are controlled from pin 11 of the microcontroller.

9.2 Microcontroller Sub Board (UP SUB Board)

9.2.1 General

This small PCB is directly soldered in on top of the Analogue-Board.
It is used with no diversity in all three different basic versions (Europe, NAFTA and APAC-Pal). Only the software being loaded into the external Flash-memory is not the same.

9.2.2 Microcontroller

The main part of the Sub-PCB is the central controller (CC) µP [7804] TMP91CW12AF, which is a 16-bit CPU with 128kBROM and 4kB RAM.
It works with a 3V3 supply and a system clock of 24,576MHz [1801].
The 3V3-supply is made out of the "5VSTBY" by the circuit around [7816].
After connecting the set to the mains (power-up) the IC [7806] generates a reset pulse. This signal ("IPOR") is directly fed to first priority interrupt input (pin 63) for power fail detection and also to the Reset-Input of the CC (Pin30) via [7802], which is necessary to generate a reset only during power-up. In case of power fail pin 30 of the CC must be kept high (3V3).
The internal memory of the CC is too small for all necessary demands. Therefore an external Flash-ROM [7805] with 1MByte in size and a RAM [7803] with 128kByte are necessary. Both parts are connected to the µP via a parallel address-/data-bus. The lower eight bus-lines (AD0 to AD7) are multiplexed by [7801] and the "ALE"-signal of the CC.
For updating of the software the external Flash-ROM can be reprogrammed by the µP. During this process [7807] is switched on by the "WE"-signal.
When no mains is connected, the CC is supplied via Gold-Cap [2816] during the power backup period. The diode [6802] prevents unwanted current consumption of other components. The internal ROM of the µP holds the program code for the Real-Time-Clock. Only the microprocessor is supplied by the backup cell, not the external memories and the µP operates in a low frequency mode with the clock crystal [1805] only (32.768 kHz). To adjust the clock the frequency can be measured at pin 87 of the µP in a special test-mode.

9.2.3 Control-Interfaces

The CC is communicating with the digital board via a serial connection, which operates at a speed of 19,4 kbit/s ("D_DATA"-, "A_DATA", "D_RDY"- and "A_RDY"-signal on

[1986]). By generating a high level on pin 16 of the CC the digital PCB can be reset (inverter [7817] in between).
Most of the other parts are controlled by the µP via I2C-bus ("SDA"- and "SCL"-signal). The FETs [7821] and [7822] are used for adaptation of the 3V3-level on CC-side to the components supplied with 5V.
The CC can also reset the display-board-µP by pulling pin 39 to high.
The transistor [7819] acts as a level shifter for the "INT"-signal.
In the European sets a bi-directional interface is established between the recording unit and the TV device at pin 10 of the Scart ("P50"-line/Easy Link). The processing is done via pin 14 (output) and pin 38 (input) of the CC and the circuit around [7813], [7814] and [7815].

9.2.4 EEPROM

The EEPROM M24C16 [7808] is an electrical erasable and programmable, non-volatile memory. The EEPROM stores data specific to the device, such as the AFC-reference value of the Europe IF-part, the clock-correction-factor, etc. It is accessed by the µP via the I2C-bus.

9.2.5 Sync Separator

To detect whether a video signal is available or not a separate IC [7825] is used to extract the sync information out of the video signal that is also routed to the digital board for recording.
While on the input a low-pass-filter ([2823] and [3869]) limits the bandwidth an additional filter (circuit around [7818]) on the output avoids distortions. Afterwards the sync-signal is routed to pin11 of the CC.

9.2.6 Fan Control

To avoid unwanted temperatures inside the set (especially the Laser on the OPU of the drive is very sensitive) a fan is located on top of the basic engine. The speed control is dependent on the ambient temp. A NTC resistor [3134] located on the display board measures the temperature. An operational amplifier [7902-B] generates a proper voltage, which is then fed to the engine ("BE_FAN"-line). Below 28°C ambient temp. the fan-voltage is approx. 5V and is increased to 10V when the ambient temperature goes up to approx. 38°C. The second part of the Op-Amp. [7902-A] prevents damage of any temperature-sensitive part in case the NTC or the wire in between is damaged. It acts as a comparator and pulls the "BE_FAN"-signal to 10V. As the fan has to be stopped in case the tray of the drive is open this voltage is "killed" by the CC ("FAN_OFF"-signal). The double-diode [6901] acts for both Op.-Amp.-circuits. The circuit is also prepared for a set-fan (circuit around the Op-Amp. [7902-C]).

9.3 Analog board Europe

9.3.1 General

This PCB consists out of the following parts:

- Power-Supply-Unit
- Frontend (Audio & Video)
- Input-/Output-switching
- Audio ADC- & DAC-processing
- VPS/PDC- and Text-Data slicer
- Analog Follow-Me Circuit

All functional groups are either controlled via I2C-bus or via separate signal lines by the Central-Controller on the µP-Sub-Board. This sub board is directly soldered in onto the analog PCB. During Stand-By mode of the set, several parts are not supplied (Tuner, MSP, ...). The microprocessor is running and maintains the clock of the set.
To avoid bus blockades the I2C-bus ("SCLSW" & "SDASW") to/from these units is decoupled via transistors [7419], [7420] from the general bus ("SCL" & "SDA").

9.3.2 Power Supply Unit

Functional principle:
This power supply works in the way of a flyback converter. In the mains input part [1931 to 2309], the mains voltage is rectified and buffered in the capacitor [2309]. From this direct voltage at [2309] energy is transferred into the transformer [5300, pins 7-5] during the conductive phase of the switching transistor [7307] and is stored there as magnetic energy. This energy is passed to the secondary outputs of the power supply in the blocking phase of the switching transistor [7307]. With the switch-on time of the switching transistor [7307], the energy transferred in every cycle is regulated in such a way that the output voltages remain constant regardless of changes in the load or mains voltage. The power transistor is driven by the integrated circuit [7313].

Mains input part:
The mains input part extends from the mains socket [1931] to the capacitor [2309]. The diodes [6301, 6302, 6305 and 6306] rectify the AC supply voltage, which is then buffered by the capacitor [2309]. The common mode coil [5302] and capacitor [2302] work as a filter to block interference arising in the power supply from the mains. Components [1302], [3306] and [3304] protect the power supply against short-term over voltages in the mains, e.g. caused by indirect lightning.

Start-up with Mains-on:
After connecting the power cord to the mains, the capacitor [2325] is loaded via a current source between pin 8 and pin 1 in the IC [7313]. Once the voltage on [2325] and therefore the supply voltage Vcc of the IC [7313] has reached approx. 11V, the IC starts up and provides pulses at its output pin 5. These pulses are used to drive the gate of the power transistor [7307]. The frequency of these pulses is depending on load and mains voltage. The current consumption of the IC is approx. 5 mA at Vcc in normal mode.
If Vcc drops to below approx. 9V (e.g. with power limitation) or if Vac exceeds approximately 16V (e.g. interruption of the control loop), the output of the IC [7313, pin 5] is blocked and a new start-up cycle begins. (See also "Overload, Power Limitation, Burst Mode" section)

Normal operation:
With the power supply in normal mode, the periodic sequences in the circuit are divided primarily into the conductive and blocking phase of the switching transistor [7307]. During the conductive phase of the switching transistor [7307], current flows from the rectified mains voltage at capacitor [2309] through the primary coil of the transformer [5300, pins 7-5], the transistor [7307] and resistors [3321, 3352] to ground. The positive voltage on pin 7 of the transformer [5300] can be assumed as constant for a switching cycle. The current in the primary coil of the transformer [5300] increases linearly. A magnetic field representing a certain value of the primary current is formed inside the transformer. In this phase, the voltages on the secondary coils are polarized such that the diodes [6300, 6303, 6307, 6308, 6310, 6313, 6317 and 6319] block. From the controller [7315] a current is supplied into the CTRL input on the IC [pin 3, 7313] via optocoupler [7314]. Once the switch on time of the switching transistor [7307] - that corresponds to the current supplied into the CTRL input - has been reached, the switching transistor [7307] is switched off. When the switching transistor has been switched off, the blocking phase begins. No more energy will be transferred into the transformer. The inductivity of the transformer will still attempt to keep the current flowing at a constant level ($U=L*di/dt$). Switching off transistor [7307] interrupts the primary current circuit. The polarity of the voltages on the transformer is reversed, which means that the diodes [6300, 6303, 6307, 6308, 6310, 6313, 6317 and 6319] become conductive and current flows into the capacitors [2305, 2312, 2319, 2322, 2326 and 2328] and the load. This current is also ramp-shaped (di/dt negative, therefore decreasing).

The feedback control for the switched-mode power supply is done by changing the conductive phase of the switching transistor so that either more or less energy is transferred from the rectified mains voltage at [2309] into the transformer. The regulation information is provided by voltage reference [7315]. This element compares the 5V-output voltage via voltage divider [3332, 3333, 3334] with an internal 2.5V reference voltage. The output voltage of [7315] passes via an optocoupler [7314] for insulation of primary and secondary parts as a current value into pin 3 on the IC [7313]. The switch-on time of the transistor [7307] is inversely proportional to the value of this current.

Overload, power limitation, burst mode:
With increasing load on one or more of the power supply outputs, the switch-on time for the power transistor [7307] increases, and thus also the peak value of the delta-shaped current through this power transistor. The equivalent voltage of this current profile is passed from resistors [3321] and [3352] via [3365] to pin 5 of the IC [7313]. If the voltage on pin 2 reaches approx. 0.4V in one switching cycle, the conductive phase of the switching transistor is ended immediately. The check is done in each individual switching cycle. This process ensures that no more than approx. 60W can be taken out from the mains (= power limitation).
If the power supply reaches the power limit, the output voltages and the supply voltage Vcc on pin 1 of the IC [7313] will be reduced following further loading. If Vcc is less than approx. 9V at any point during this process, the output of the IC [7313, pin 6] is blocked. All output voltages and Vcc decrease and a new start-up cycle begins. If the overload status or short-circuit remains, the power limitation will be activated immediately and the voltages will again decrease, followed by another start-up cycle (Burst Mode). The amount of power taken up from the mains in burst mode is low.

Standby modes:
In the 'AV-Standby' operating mode of the set, the 'ION' control line is primarily used to switch off all output voltages for Basic Engine and Digital Board (supplies 3V3, 5V, 12V, 5N and 4V6 at Connectors 1932 and 1933) of the power supply. This reduces the amount of power taken from the mains. In Low Power Standby mode additionally the 'STBY' control line is used to switch off output voltages 5SW and 8SW. This reduces power consumption to less than 3W, if additionally the display is switched off. The power supply will continue operating in Standby mode with a switching frequency of approx. 25 kHz.

9.3.3 Frontend

This unit is designed to support two basic versions, which are distinguished by a different assembly variant only (one for multistandard and the second for Pal-I only) and comprises the following parts:

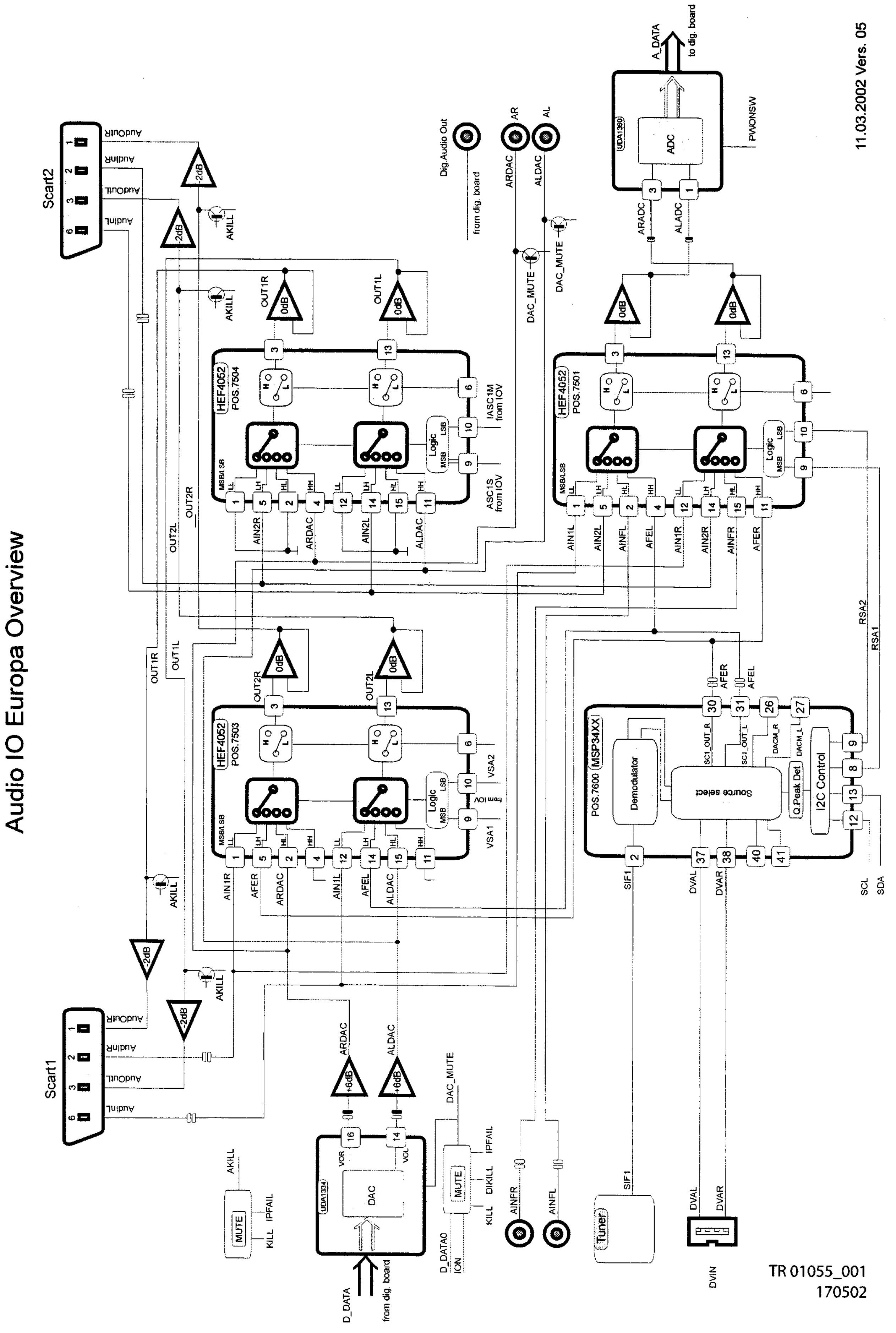
- Tuner UV1316K [1705]
- IF amplifier & video demodulator IC TDA 9818/9817 [7710]
- Sound processor MSP3415G [7600]

Tuner and IF selection
The Tuner [1705] converts the RF-signal coming from the antenna input to an IF-signal. The tuner is fully controlled via I^2C-bus of the CC-µP. [1705] is also equipped with a "passive-loop-through" between antenna-in and -out to save power in stand-by of the set, when the complete part is not supplied. The IF frequency of the video carrier is 38.9 MHz for all systems except SECAM L' (34,0 MHz).
A quasi-split audio system is used. Separate surface-wave filters (SAW) are required. [1701], [1703] for video, [1702] for audio. [1701] is switched into the signal path for DK/I-SECAM L/L' reception, if the signal "SFS_TS" is "high". In this case the switches [7704], [7705] are open and the diode [6703] is conducting. [1703] is switched into the signal path for BG reception ("SFS_TS" is "low"). Then the switch [7712] is open and the diode [6704] is conducting. For DK/I-SECAM L/L' reception, an additional circuit for suppressing the audio carrier of the adjacent channel is used. This circuitry is adjusted by coil [5710] for maximum suppression at 40.4MHz.

IF demodulator
The signal from the tuner and IF-selection circuit is processed by the demodulator IC TDA 9818/9817 [7710]. The signal "PSS" to pin 3 switches between demodulation of positive (SECAM only) or negative modulated video carriers. A QSS-audio-IF signal SIF1 is generated for demodulation in the sound processor [7600]. The audio-IF carrier is selected in the audio SAW filter [1702]. This filter is switched for SECAM L'. If the signal "SB1" is "high", the switch [7714] is closed and the diode [6705] is not conducting. For all other standards the diode [6705] is conducting and the switch [7714] is open. The output signal of this SAW filter is firstly processed in the TDA 9818. Audio carriers are converted from the tuner IF level to the audio IF position and further processed in the audio demodulator [7600]. The AFC coil [5711] on the TDA 9818/9817 is adjusted so that when a frequency of 38.90 MHz is supplied to the IF output of the tuner, the AFC voltage on pin 17 of [7710] is 2.5V. The setting of the picture carrier frequency for SECAM L in the TDA 9818 is achieved by connecting pin 7 of the IC via a resistor [3710] to ground. The switch [7701] and the signal "SB1" do this. The HF-AGC is set using the potentiometer [3724] so that, with a sufficiently large antenna input signal (74 dBµV), the voltage at the IF output of the tuner [1705] pin 11 is 500 mVpp. This setting must be carried out when the audio carrier is switched off. The demodulated video signal appears on pin 16 of [7710]. The AGC voltage at pin 4 is used to determine the antenna signal strength after a buffer [7717] with the signal "AGC" and an analog input port of the CC-P. The trap [1704] reduces the sound carrier remainders in the video for BG standards. The trap [1706] works in the same way for the Pal-I standard only. For all other standards the switch [7713] is closed via [7706] and "SFS_TS"-line set "high" to bypass this trap. In these cases the selectivity of the SAW filter [1701] is sufficient. The coil [5713] for non-BG standards realizes a frequency response correction. This correction is not desired for SECAM L' and therefore short-circuited by [7716] (signal SB1 is "high" and [7702] has on-status). The demodulated video signal "VFV" is available after the buffer and limiting stage for noise peaks [7711]. The FM-PLL demodulator function of TDA 9818 is not necessary and therefore deactivated by the resistor [3739].

Audio demodulator
The sound demodulation is done by the MSP3415 [7600], which is also fully controlled via I^2C-bus by the CC-P (determination of bandwidth, amplitude, standard, ...).The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing.

9.3.4 Audio routing


Audio IO Europa Overview
11.03.2002 Vers. 05
Scart2
Scart1
AudOutR
AudInR
AudOutL
AudInL
-2dB
AKILL
OUT1R
OUT1L
OUT2R
OUT2L
0dB
HEF4052
POS.7504
POS.7503
POS.7501
Logic
MSB
LSB
ASC1S from IOV
ASC1M from IOV
VSA1
VSA2
from IOV
AIN2R
ARDAC
AIN2L
ALDAC
AIN1R
AFER
AIN1L
AFEL
AINFL
AINFR
Dig.Audio Out
from dig. board
AR
AL
DAC_MUTE
A_DATA
to dig. board
UDA1360
ADC
PWONSW
ARADC
ALADC
MSP34XX
POS.7600
Demodulator
Source select
Q.Peak Det
I2C Control
SC1_OUT_R
SC1_OUT_L
DACM_R
DACM_L
SIF1
DVAL
DVAR
RSA1
RSA2
SCL
SDA
+6dB
UDA1334
DAC
VOR
VOL
D_DATA
from dig. board
D_DATA0
ION
MUTE
KILL
DIKILL
IPFAIL
Tuner
DVIN
TR 01055_001
170502

The processing of audio is always done in stereo (e.g. separate left- and right-channel) and the complete switching is realized by using HEF4052, which is a dual four-to-one multiplexer. In principle there are three independent selectors:

a) Scart 1-Output-Path:
Pos [7504] is used to select either Scart 2-Input ("AIN2L"/ "AIN2R") or the signal directly from the audio DAC [7004] ("ALDAC"/"ARDAC") as the output source for Scart 1 ("AOUT1L"/"AOUT1R").
The control is done by means of the lines "ASC1S" coming from [7408] (IC [7408] acts as a port expander for the CC-P) and "IASC1M", which is directly coming from the CC. Pos [7412] is used for level adaptation (3V3 to 5V) for the "IASC1M"-signal.

b) Scart 2-Output-Path:
Pos [7503] selects between Scart 1-Input ("AIN1L"/"AIN1R"), signals from the internal frontend ("AFEL"/"AFER") via MSP [7600] or audio directly from the DAC [7004] ("ALDAC"/ "ARDAC"). The outputs of this switch are routed to Scart 2 ("AOUT2L"/AOUT2R"). This switch is controlled via "VSA1"- and "VSA2"-line. These lines come from [7408] that is acting as a port expander for the CC-P.

c) Record-Path:
Pos [7501] selects either signals from Scart 1 ("AIN1L"/ "AIN1R") or Scart 2 ("AIN2L"/"AIN2R") or Cinch-Front ("AINFL"/ "AINFR") or the MSP [7600] ("AFEL"/"AFER") and routes to the audio ADC [7007] ("ALADC"/"ARADC") for record purposes. The switch is controlled via "RSA1"- and "RSA2"-signals. These signals come from the MSP [7600], which acts as a port expander of the CC-P. As there can also exist a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP. The MSP acts as a preselector between audio from internal frontend or the DV-Input.
Each of these three selectors ([7501], [7503] & [7504]) has a separate Op-Amp on the output for level-adaptation-, performance- and line-driving-reasons. [7505-A & -B] for record, [7502-C & -D] for Scart 1-Output and [7502-A & -B] respectively for Scart 2. Every audio output line on the two Scart connectors can be "killed" (muted) by an extra transistors ([7506], [7508], [7509] &[7511]), which can be activated by the "AKILL"-line. This signal is generated by the circuit around [7404]/[7421] and is a combination of the "KILL"- from the CC-P and the "IPFAIL" of the power-supply-unit.

d) Line-Out-Path:
see chapter 9.3.5

e) Digital Audio Output-Path without IOE-Print:
Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the "DAOUT"-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3580] to cinch plug [1951]. The capacitor [2580] performs an AC-coupling between connector- and set-ground.

f) Digital Audio Output-Path with IOE-Print:
In case of usage of the IOE-print the digital audio signals (input and output) are directly routed from digital board via interface cable to plug [1920] on the IOE-print. The "DAOUT"-line is splitted into two signals, one for cinch out and one for optical out. The signal to cinch out first passes a 5-fold inverter [7250] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5250] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3259] to the cinch plug [1925] (or [1926-B] in case of option "DIGITAL IN"). The capacitors [2256] and [2266] perform an AC-coupling between connector- and set-ground. The second "DAOUT"-signal is fed directly via [3264] to the optical out transmitter [6255].

g) Digital Audio Input-Path with IOE-Print:
There are two possibilities for a digital audio input signal in case of option "DIGITAL IN". One is the signal from the optical receiver [6259], which is routed via [3269] directly to plug [1920]. The second is the signal from the cinch plug [1926-A]. This signal then passes an inverting amplifier [7250-6] and is then routed via [2253] to the plug [1920].

9.3.5 Audio ADC/DAC

a) PCBs with AD1852 [7004]:
The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7007]. This IC can process input signals up to 2Vrms by using external resistors [3047], [3053] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7007] to 3,3V via [7008] and the "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.
The transformation of dig. audio back into the analog domain is done by AD1852 [7004]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 17/16 and pin 12/13 of [7004] as symmetrical signals. Afterwards an Op-Amp. [7003] (line driver & converting to unsymmetrical signal, gain = 1), which is also working as low-pass-filter to increase signal performance (noise, distortions,...), is passed. Then both signals ("ALDAC" & "ARDAC") are directly routed to the rear cinch output and also used in the audio-I/O for further processing. The DAC has also a mute possibility, which can be activated by setting pin 23 to 5V via [7001]. This mute is controlled either by the dig. board ("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit (in this case it's the combination of "A_KILL" and "IPFAIL").
If the DAC is muted externally via pin 23 or if there are no audio data available (e.g. "D_DATA0"-line zero), the output pins 8 and 22 of the DAC change to high (+ 5V). These two signals are then combined with diode pos. 6006. After decoupling via [7009] the signal "DAC_MUTE" is used as mute signal for the mute transistors [7415], [7416] for cinch rear out.

b) PCBs with UDA1334BTS [7001]:
The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to 2Vrms by using external resistors [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and the "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.
The transformation of dig. audio back into the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation, gain = 2) which is also working as low-pass-filter to increase signal performance (noise, distortions,...), is passed. Then both signals ("ALDAC" & "ARDAC") are directly routed to the rear cinch output and also used in the audio-I/O for further processing. The DAC has also a mute possibility, which can be activated by setting pin 8 to 3,3V via [7003]. This mute is controlled either by the dig. board

("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit (in this case it's the combination of "A_KILL" and "IPFAIL").
In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of "digital silence" by the circuit around [7008], [7009] and [7010], when no audio data are available (e.g. "D_DATA0"-line zero).
This function can be also activated via the "ION"-line (set to high during any stand-by mode). To avoid signal distortions (clipping) the mute transistors for cinch rear out [7415], [7416] are decoupled via [7011].

9.3.6 Video-routing

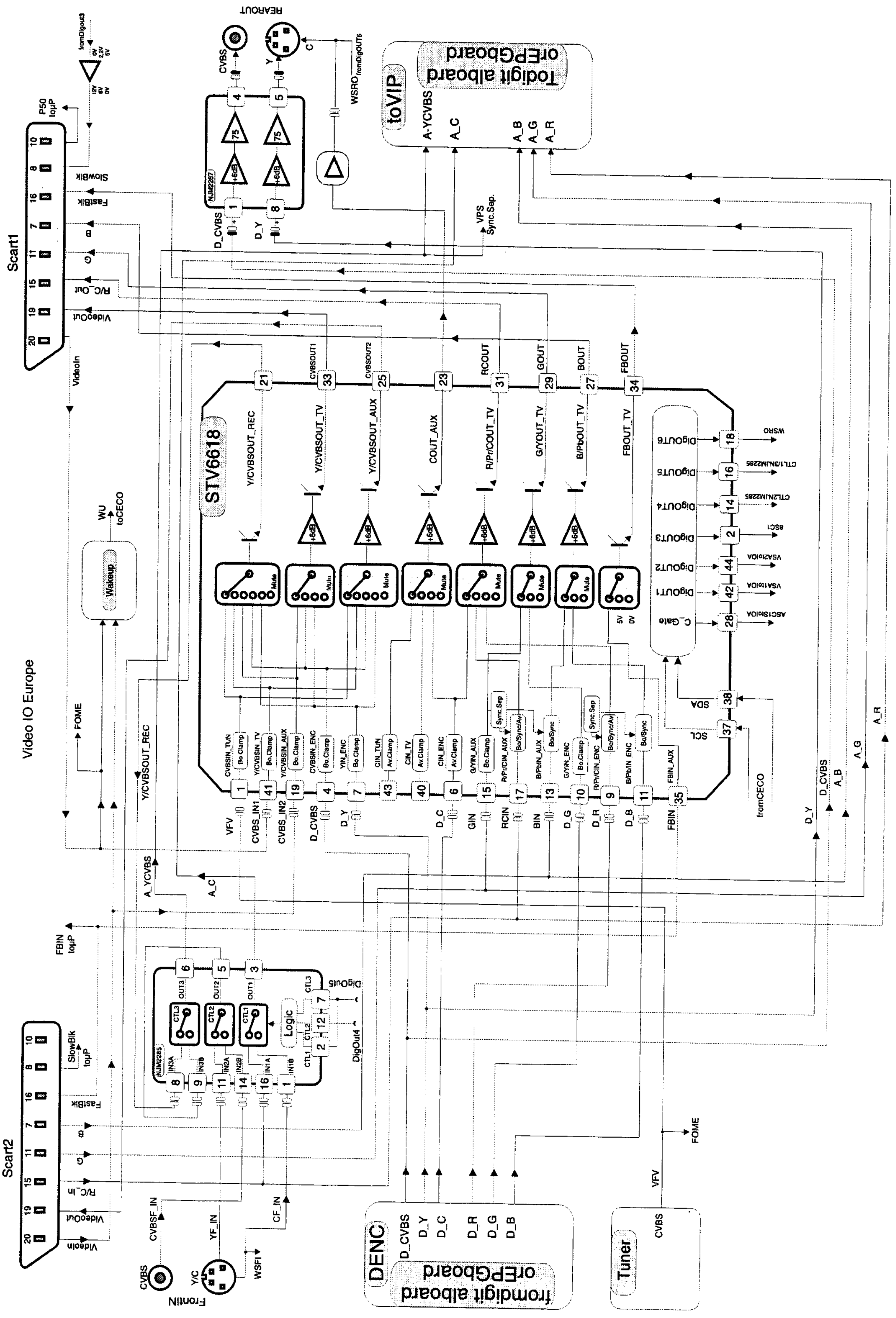

Video IO Europe
Scart1
Scart2
STV6618
NJM2287
NJM2285
toVIP
Todigit alboard orEPGboard
fromdigit alboard orEPGboard
DENC
Tuner
Wakeup
WU toCECO
FOME
REAROUT
FrontIN
CVBS
Y
C
Y/C
WSRO
VPS Sync.Sep.
A-YCVBS
A_C
A_B
A_G
A_R
D_CVBS
D_Y
D_C
D_R
D_G
D_B
P50 touP
SlowBlk
FastBlk
B
G
R/C_Out
R/C_In
VideoOut
VideoIn
FBIN touP
SlowBlk touP
CVBSF_IN
YF_IN
CF_IN
WSFI
Y/CVBSOUT_REC
CVBSOUT1
CVBSOUT2
RCOUT
GOUT
BOUT
FBOUT
Y/CVBSOUT_TV
Y/CVBSOUT_AUX
COUT_AUX
R/Pr/COUT_TV
G/YOUT_TV
B/PbOUT_TV
FBOUT_TV
Mute
+6dB
75
DigOUT6
DigOUT5
DigOUT4
DigOUT3
DigOUT2
DigOUT1
C_Gate
SDA
SCL
fromCECO
CVBSIN_TUN
Y/CVBSIN_TV
Y/CVBSIN_AUX
CVBSIN_ENC
YIN_ENC
CIN_TUN
CIN_TV
CIN_ENC
G/YIN_AUX
R/Pr/CIN_AUX
B/PbIN_AUX
G/YIN_ENC
R/Pr/CIN_ENC
B/PbIN_ENC
FBIN_AUX
Bo.Clamp
Av.Clamp
Sync.Sep
Bo/Sync/Av
Bo/Sync
VFV
CVBS_IN1
CVBS_IN2
GIN
RCIN
BIN
FBIN
Logic
CTL1
CTL2
CTL3
OUT1
OUT2
OUT3
IN1A
IN1B
IN2A
IN2B
IN3A
IN3B
DigOuts
DigOut4
fromDigOUT6
fromDigout3
5V
0V

Figure 9-1

The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I^2C-bus by the CC. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6 dB-amplification and a 75 Ohms driver-stage inside. This IC includes also several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from frontend ("VFV"), the input from Scart 1 ("YCVBSIN1") or the signal from Scart 2 ("YCVBSIN2"). Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones are done. The output signals of [7411] are fed as "A_YCVBS"- and "A_C"-line to the digital board for further processing.

To reduce the number of external presets there exists only one preset for CVBS- and Y/C-front. The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on µP-sub-board) where Y/C has higher priority.

The R/G/B-inputs and the Fast-Blanking-line from Scart 2 are routed over the optional EPG board to the digital PCB. Also all other video signal from the analog board are routed through the EPG board if present. These signals are also available on the corresponding input-pins of the STV6618 to enable a loop-through in AV-Standby. In this mode the set has to behave like a cable between the two Scart-connectors. AV-Standby is activated either by a "high" level on pin 8 of Scart 2 ("active device is present") or by the "WU"-line (wake up). This signal is generated out of the circuit around [7401], [7402] & [7403] and will become "high" if there is a signal on pin 20 of Scart 1- or Scart 2. The detection of the input level on pin 8 of Scart 2 ("8SC2") is done via an analog input of the CC-P (less than 2V means inactive; 4,5V to 7V determines a source with 16:9 picture-ratio and greater than 9,5V is an active 4:3 source).

All signals from the digital board ("D_R", "D_G", "D_B", D_C", "D_Y" and "D_CVBS" are routed to the proper inputs of the STV6618 for amplification and driving purpose before they can be seen on the appropriate Scart outputs. In case of EPG the signals from the digital board are routed through the EPG board where the selection between digital board video or EPG OSD is taken.

The "D_CVBS"- and the "D_Y"-line are passing a 6 dB-amplifier and driver-IC [7410] and are then routed to the CVBS-Cinch and Y/C-out rear. The chroma signal for this Y/C out is coming from the STV6618 - which makes the 6 dB-amplification - and a driver [7406] in between.

The detection of the picture ratio information on the Y/C-input front is made by measuring the DC-level on the Chroma signal via analog input of the CC-P ("WSFI"-line). In case the level is higher than 3,5V the input signal is a 16:9 source. If the level is lower than 2,4V the picture ratio is 4:3.

For generation of the appropriate DC-voltage on the Y/C-out rear the "WSRO"-line is controlled via pin 18 of [7408] by the CC-P (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

The control of the switching voltage (Pin 8 of Scart 1) is done via 3-level-pin (nr.2) of the STV6618 [7408] and the transistors [7405], [7407] & [7409]. A "low" on pin 2 of [7408] causes around 11V on pin 8-Scart 1 (e.g. source with 4:3 picture-ratio active). Medium level (2,5V) on pin 2 of the STV6618 generates medium level (approx. 6V) on pin 8-Scart 1 (e.g. active source with 16:9) and a "high" on pin 2 of the STV6618 pushes pin 8-Scart 1 to "low" (e.g. inactive).

9.3.7 VPS/PDC- and Text-Dataslicer

For extraction of relevant information out of the video signal (time controlled recording, net-name-identification, time- & date- download) the STV5348 [7931] is used. Data transfer to/from the CC is fully done via I^2C-bus and the input signal for decoding is the same as the one being routed to the digital board for recording purposes ("A_YCVBS"-line).

9.3.8 Analog Follow-Me

This circuit compares the video signal from the internal frontend ("VFV") of the recorder with that one of the connected TV-set ("CVBS1"). The TV set delivers the signal via Scart-cable. A comparator [7934] and several additional parts ([7932], [7933], ...) are used to compare the two video signals. In case of both input signals are equal the output-line of this circuit ("FOME") is set to low. Detection is made via an input port of the CC-P.

9.4 Analog board NAFTA- & APAC-Pal- version

9.4.1 Frontend NAFTA

[1701] demodulates the video signal from the antenna input. Tuner and IF-demodulator are in one unit. Also a modulator is included in that part. The audio- and video-signal to the modulator are the ones from the selected input or the playback path of the set ("AMCO"- and "D_CVBS"-line). The control of the tuner is fully done via I^2C-bus by the CC-P. Via the "MSW"-signal and [7701] the modulator is switched on and off. In opposite to this the antenna loop-through is opened or closed. In the APAC-Pal version POS [1700] is used with the difference that it demodulates only PAL- instead of NTSC-signals and has also no modulator. The "CSW_SSW" line switches the modulator between CH3 or CH4 in the NTSC-version.

To achieve optimal tuning the "AFC"-signal is detected by the CC via an analog input; [3701], [3702] and [3703] are used for level adaptation (5V to 3V3). Pos [7700] is a driver for the video signal.

The sound demodulation is realized by the MSP34x5 [7600], which is also fully controlled via I^2C-bus by the CC-P (determination of bandwidth, amplitude, standard, ...). The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing. As this PCB is used for different regions (NAFTA and APAC) either MSP3425 or MSP3415 are assembled.

9.4.2 Audio routing

Audio IO NAFTA / APAC Overview

12.03.2002 Vers. 05

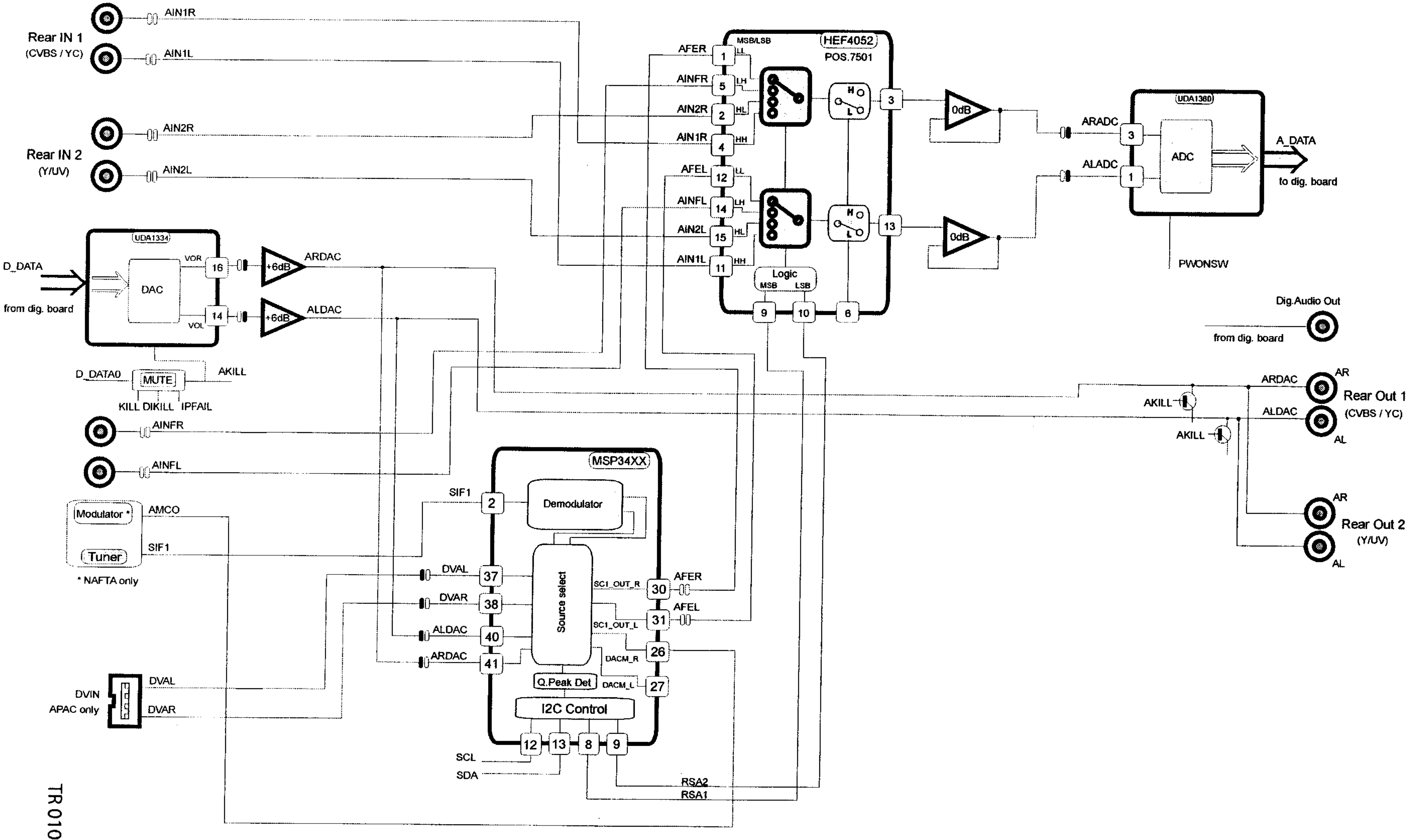

Rear IN 1
(CVBS / YC)
AIN1R
AIN1L
Rear IN 2
(Y/UV)
AIN2R
AIN2L
HEF4052
POS.7501
MSB/LSB
AFER
AINFR
AIN2R
AIN1R
AFEL
AINFL
AIN2L
AIN1L
LL
LH
HL
HH
1
5
2
4
12
14
15
11
3
13
H
L
Logic
MSB
LSB
9
10
6
0dB
0dB
UDA1360
ARADC
ALADC
3
1
ADC
A_DATA
to dig. board
PWONSW
D_DATA
from dig. board
UDA1334
DAC
VOR
VOL
16
14
+6dB
+6dB
ARDAC
ALDAC
D_DATA0
MUTE
AKILL
KILL DIKILL IPFAIL
AINFR
AINFL
Modulator *
Tuner
* NAFTA only
AMCO
SIF1
Dig.Audio Out
from dig. board
AKILL
AKILL
ARDAC
ALDAC
AR
AL
Rear Out 1
(CVBS / YC)
AR
AL
Rear Out 2
(Y/UV)
MSP34XX
SIF1
2
Demodulator
DVAL
DVAR
ALDAC
ARDAC
37
38
40
41
Source select
SC1_OUT_R
SC1_OUT_L
DACM_R
DACM_L
30
31
26
27
AFER
AFEL
Q.Peak Det
I2C Control
12
13
8
9
SCL
SDA
RSA2
RSA1
DVIN
APAC only
DVAL
DVAR

Figure 9-2

TR 01057_001
170502

The sound processing is always done in stereo (that means separate left- and right-channel).

a) Record-Path:
The complete selection of the audio signal for recording is done by a HEF4052 [7501], which is a dual four-to-one multiplexer. The input lines for the selector [7501] are coming either from MSP [7600] ("AFEL"/"AFER") or cinch rear in 1 ("AIN1L"/ "AIN1R") or cinch rear in 2 ("AIN2L"/"AIN2R") or the cinch in front ("AINFL"/AINFR"). The [7501] is controlled via "RSA1"- and "RSA2"-signals coming from the MSP [7600]. The MSP acts as a port expander of the CC-P. The Op-Amp on the output [7504] is necessary for performance reasons and acts also as a driver. The selected signals "ARADC" and "ALADC" are directly fed to the Audio-ADC.
As there can exist also a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP, which acts as a preselector between audio from internal frontend or the DV-Input.

b) Line-Out-Path:
see chapter 9.4.3

c) Digital Audio Output-Path without IOE-Print:
Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the "DAOUT"-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3580] to cinch plug [1951]. The capacitors [2580], [2582] and [2583] perform an AC-coupling between connector- and set-ground.

d) Digital Audio Output-Path with IOE-Print:
see chapter 9.3.4.f

e) Digital Audio Input-Path with IOE-Print:
see chapter 9.3.4.g

9.4.3 Audio ADC/DAC

The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to 2Vrms by using an external resistor [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.
The transformation of dig. audio back to the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation) which also works as a low-pass-filter to increase signal performance (noise, distortions,...) is passed. Then both signals ("ALDAC" & "ARDAC") are directly routed to the rear cinch output. The DAC has also a mute possibility, which can be activated by setting pin 8 to 3,3V via [7003]. This mute is controlled either by the dig. board ("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit. In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of "digital silence" by the circuit around [7008], [7009] and [7010], when no audio data are available (e.g. "D_DATA0"-line zero).
The signals from the audio DAC part ("ARDAC"/"ALDAC") are directly routed to both cinch rear outputs, which are connected in parallel. To avoid plops and any other audible noise on the output there is a mute-stage implemented [7509], [7511] for each channel. The activation is done via "AKILL"-line, which is a combination of the "KILL" from CC-P, "DAC_MUTE" from DAC-part and "IPFAIL" from the power-supply-unit. The circuit around [6430], [6431], [7430] and [7404] generates this signal.

9.4.4 Video-routing

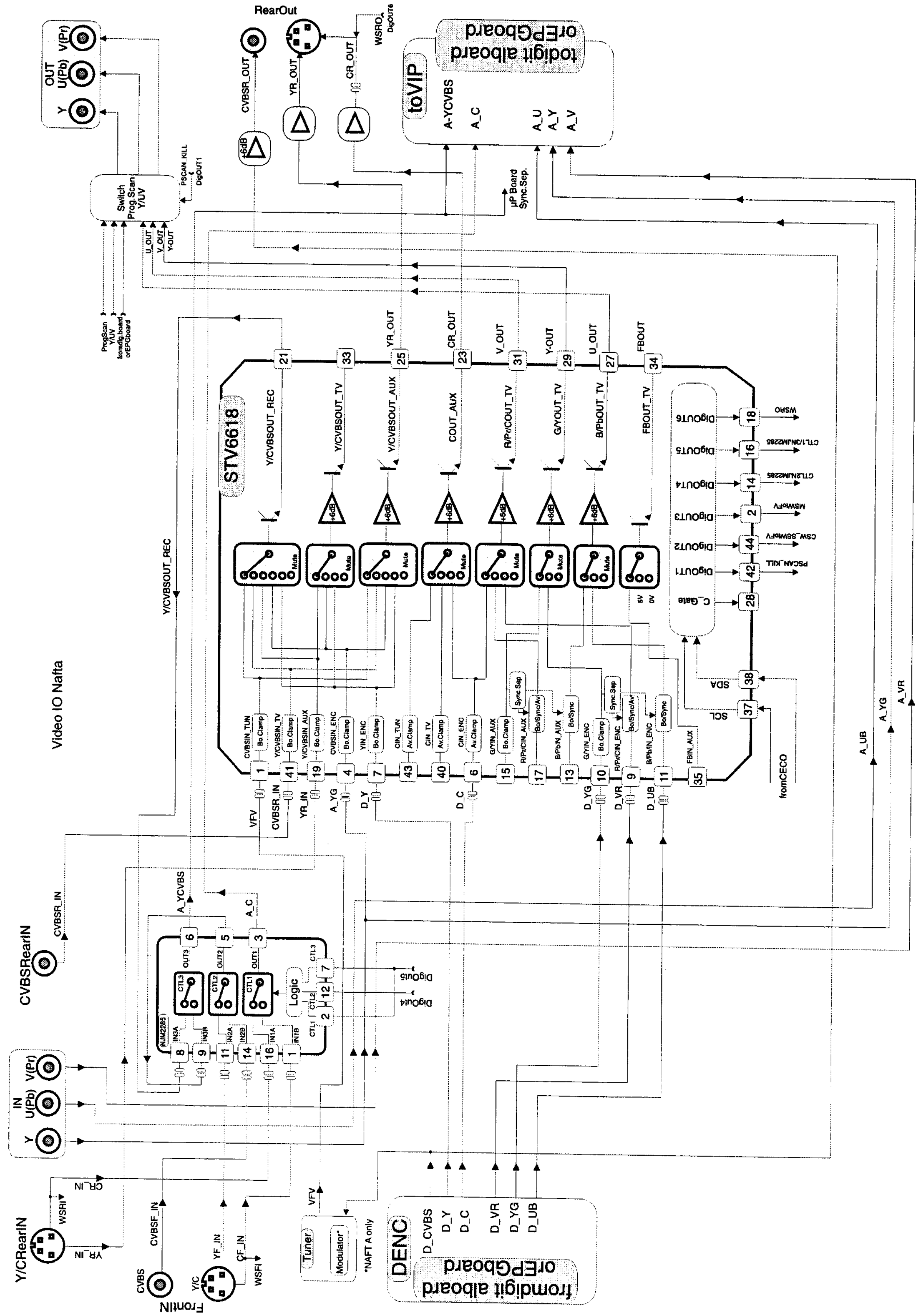

Video IO Nafta
OUT
Y
U(Pb)
V(Pr)
RearOut
CVBSR_OUT
YR_OUT
CR_OUT
WSRO
DigOUT6
+6dB
toVIP
todigit alboard
orEPGboard
A-YCVBS
A_C
A_U
A_Y
A_V
Switch
Prog.Scan
Y/UV
PSCAN_KILL
DigOUT1
µP Board
Sync.Sep.
U_OUT
V_OUT
Y-OUT
ProgScan
Y/UV
fromdig.board
orEPGboard
STV6618
Y/CVBSOUT_REC
Y/CVBSOUT_TV
Y/CVBSOUT_AUX
COUT_AUX
R/Pr/COUT_TV
G/YOUT_TV
B/PbOUT_TV
FBOUT_TV
YR_OUT
CR_OUT
V_OUT
Y-OUT
U_OUT
FBOUT
21
33
25
23
31
29
27
34
Mute
DigOUT6
DigOUT5
DigOUT4
DigOUT3
DigOUT2
DigOUT1
C_Gate
18
16
14
2
44
42
28
WSRO
CTL1/NJM2285
CTL2/NJM2285
MSWtoFV
CSW_SSWtoFV
PSCAN_KILL
5V
0V
SDA
SCL
38
37
fromCECO
CVBSIN_TUN
Y/CVBSIN_TV
Y/CVBSIN_AUX
CVBSIN_ENC
YIN_ENC
CIN_TUN
CIN_TV
CIN_ENC
G/YIN_AUX
R/Pr/CIN_AUX
B/PbIN_AUX
G/YIN_ENC
R/Pr/CIN_ENC
B/PbIN_ENC
FBIN_AUX
Bo Clamp
Av.Clamp
Sync Sep
Bo/Sync/Av
Bo/Sync
1
41
19
4
7
43
40
6
15
17
13
10
9
11
35
VFV
CVBSR_IN
YR_IN
A_YG
D_Y
D_C
D_YG
D_VR
D_UB
Y/CVBSOUT_REC
A_UB
A_YG
A_VR
CVBSRearIN
CVBSR_IN
A_YCVBS
A_C
6
5
3
OUT3
OUT2
OUT1
CTL3
CTL2
CTL1
Logic
7
12
2
DigOut6
DigOut4
NJM2285
IN3A
IN3B
IN2A
IN2B
IN1A
IN1B
8
9
11
14
16
1
IN
Y
U(Pb)
V(Pr)
Y/CRearIN
WSRI
CR_IN
YR_IN
FrontIN
CVBS
CVBSF_IN
Y/C
YF_IN
CF_IN
WSFI
VFV
Tuner
Modulator*
*NAFTA only
DENC
D_CVBS
D_Y
D_C
D_VR
D_YG
D_UB
fromdigit alboard
orEPGboard

Figure 9-3

The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I^2C-bus by the CC. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6dB-amplification and a 75 Ohms-driver-stage inside. This IC also includes several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from frontend, the CVBS from Cinch-Rear or Y from the S-Video-input rear. Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones is done. The output signals of [7411] are fed as "A_YCVBS"- and "A_C"-line to the digital board for further processing.
To reduce the number of external presets there is only one station for CVBS or Y/C (front and rear). The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on µP-sub-board) where Y/C has higher priority.
The Y/U/V-inputs are routed over the optional EPG board to the digital PCB. Only the Y-line has to be present additionally on pin 4 of [7408] for video recognition. Also all other video signal from the analog board are routed through the EPG board if present.
The signals "D_C" and "D_Y" are fed through [7408] (6dB amplification) and via [7406], [7409] used as driver to the S-Video output connector. The "D_CVBS" line is directly routed to the modulator and via the circuit around [7431] and [7432] amplified by 6dB before it is fed to the CVBS output plug. In case of EPG the signals from the digital board are routet through the EPG board where the selection between digital board video or EPG OSD is taken.
The Y/U/V signals from the digital board are also passing [7408] for 6dB amplification and driving purpose.
To achieve optimal picture quality the set is equipped with a simple progressive scan function based on a so-called line doubler. The complete generation of the signal is done on the digital board and via a separate cable and connector [1946] the corresponding Y/U/V lines are routed to the analog PCB. Also the YUVprogressive signals are switchable to EPG OSD on the EPG board if implemented. As there is only one Y/U/V output available a switching between interlaced and progressive output is necessary. While the transistors [7421], [7422], [7424], [7425], [7427] and [7428] are used as driver for Y/U/V progressive, [7423], [7426] and [7429] together with [7405] are necessary for killing these signals via pin 42 of [7408] in case the interlaced is selected ("PSCAN_KILL"-line set to low). If progressive output is active the pins 27, 29 and 31 of [7408] are set to high impedance and "PSCAN_KILL" is also high (e.g. 5V).
The detection of the picture ratio information on the Y/C inputs (rear or front) is done by measuring the DC-level on the Chroma signal via an analog input of the CC-P ("WSRI"- and "WSFI"-line). In case the level is higher than 3,5V the input signal is a 16:9 source, if the level is lower than 2,4V the picture ratio is 4:3.
For generation of the appropriate DC-voltage on the Y/C output the "WSRO"-line is controlled via pin18 of [7408] by the CC-P (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).
During Stand-By there is also no loop-through of any input to any output performed.

9.5 Digital Board Chrysalis F

9.5.1 Introduction

Block diagram 2nd generation DVD recorder

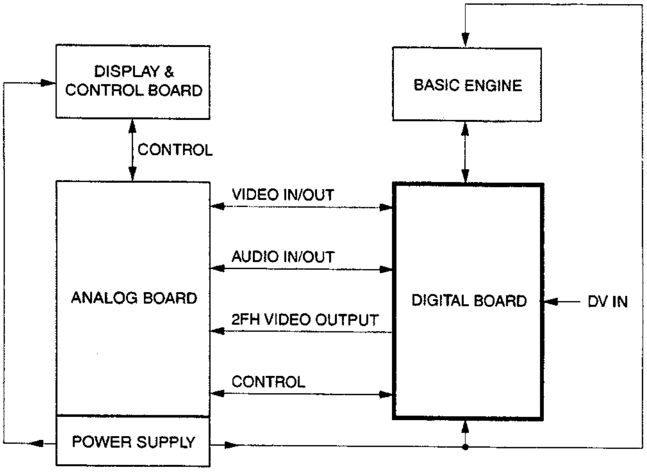


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Figure 9-4

This 2nd generation Digital Board is based on the highly integrated 'Chrysalis' IC. Its predecessors, the 'Empire' and 'Empress' based boards, had two PWBs mounted on top of each other (due to separate DVIO board). For this new generation, all functionality is now available on one PWB in one BGA IC (Ball Grid Array) i.s.o. four VLSI ICs.

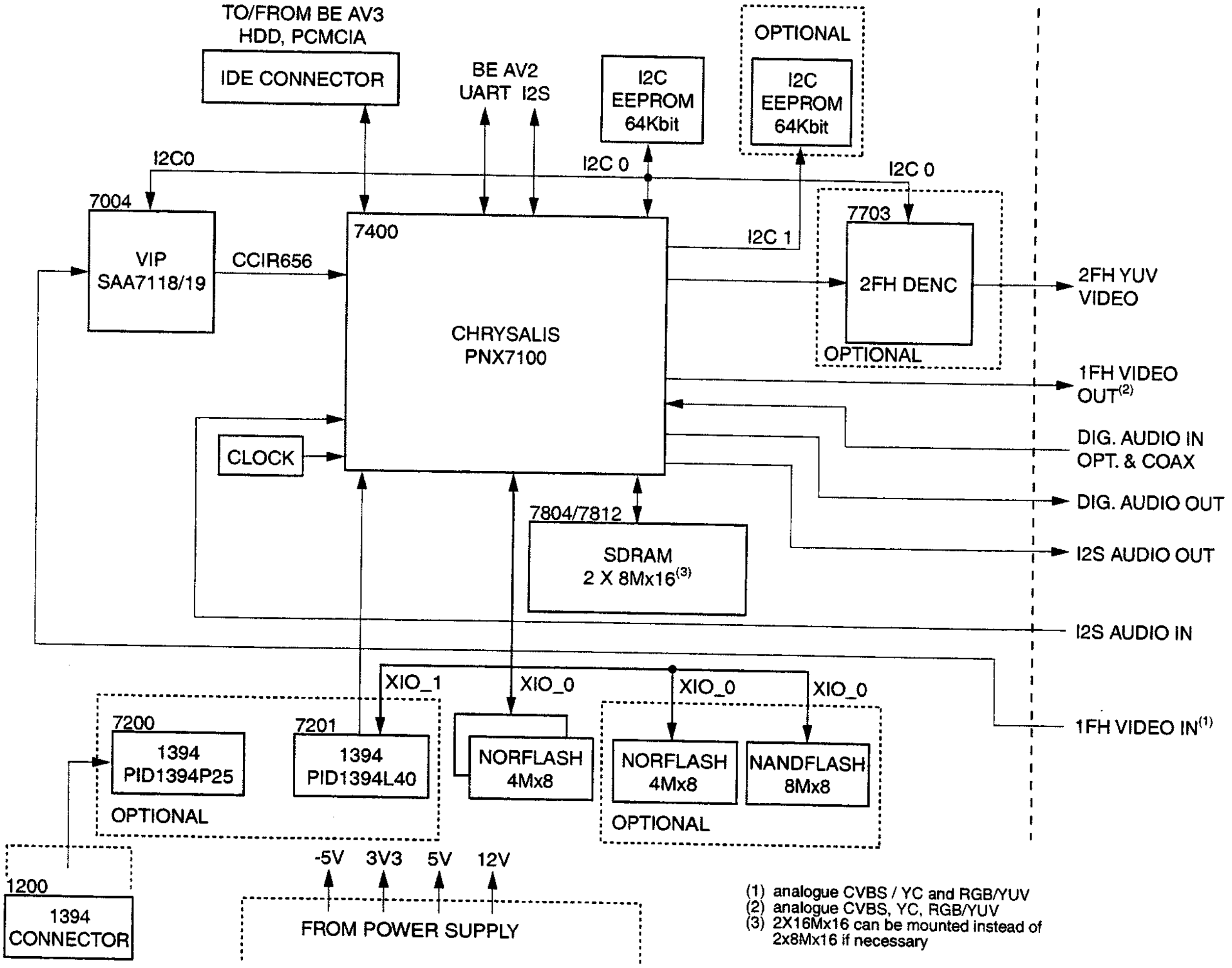
The board encodes and multiplexes analogue video and digital uncompressed audio (I2S) into an MPEG2 stream. This MPEG2 stream is formatted, to be recorded by the DVD+RW engine. In playback, the board will decode the MPEG2 stream into analogue and digital audio and into analogue video. In addition, a DV stream can be received via IEEE1394 (i-Link), and transformed to MPEG2 format.

There are versions foreseen, to generate a progressive scan analogue video output. In the standard Chrysalis board, the progressive video output is generated by the PNX7100. In the Chrysalis 'F' it is generated by the Faroudja FLi2301.

The Chrysalis Digital board is pin compatible with the Empress digital board in terms of A/V IO, BE interface, Power Supply, and Service interface. For functional enhancements, several connectors are added:IDE connector (HDD, AV3, PCMCIA, etc.).

9.5.2 Record Mode

Block diagram Chrysalis Digital Board


TO/FROM BE AV3
HDD, PCMCIA
IDE CONNECTOR
BE AV2
UART I2S
I2C
EEPROM
64Kbit
OPTIONAL
I2C
EEPROM
64Kbit
I2C0
I2C 0
I2C 0
7004
VIP
SAA7118/19
CCIR656
7400
CHRYSALIS
PNX7100
I2C 1
7703
2FH DENC
OPTIONAL
2FH YUV
VIDEO
1FH VIDEO
OUT(2)
DIG. AUDIO IN
OPT. & COAX
DIG. AUDIO OUT
I2S AUDIO OUT
I2S AUDIO IN
1FH VIDEO IN(1)
CLOCK
7804/7812
SDRAM
2 X 8Mx16(3)
XIO_1
XIO_0
XIO_0
XIO_0
7200
1394
PID1394P25
7201
1394
PID1394L40
OPTIONAL
NORFLASH
4Mx8
NORFLASH
4Mx8
NANDFLASH
8Mx8
OPTIONAL
1200
1394
CONNECTOR
-5V 3V3 5V 12V
FROM POWER SUPPLY

(1) analogue CVBS / YC and RGB/YUV
(2) analogue CVBS, YC, RGB/YUV
(3) 2X16Mx16 can be mounted instead of 2x8Mx16 if necessary

CL 36532004_003.eps
140203

Figure 9-5

Video Part

The analogue video input signals CVBS, YC, and YUV/RGB (RGB for EURO and YUV for USA), are routed via the analogue board to connector 1904 and sent to IC7004 (SAA7118, Video Input Processor).
The digital video input signals are routed from the DV-In connector (item 1200) via ICs 7200 (1394 PHY) and 7201 (1394 LINK) to IC7400 (PNX7100, Chrysalis).
The multistandard Video Input Processor (VIP, IC7400) encodes the analogue video to digital video stream (CCIR656 format). It provides filtering of the analogue signals and separation of luminance and chrominance by a comb filter. The output stream, named ITU_IN(7:0), is then routed to the Chrysalis IC (PNX7100). This IC encodes and decodes the digital video stream into/from MPEG2 format.

Audio Part

I2S audio is sent from the analog board to the Chrysalis IC via connector 1900. The Chrysalis compresses the I2S audio data into an MPEG1-L2/AC3 audio stream.

Front-end I2S

IC7400 (Chrysalis) interfaces directly to the Basic Engine (BE) via connectors 1100 (clock and data) and 1105 (control). For future use (with AV3 BE module, HDD, or card reader) it also interfaces to an IDE bus via connector 1102 .
It buffers the data streams that are coming from (or going to) these hardware modules.

In the Chrysalis, the video MPEG2 stream and the audio AC3 stream are multiplexed into an I2S stream. The serial data are sent to the Basic Engine for recording.

Front-end IDE Interface

IC7400 (Chrysalis) interfaces directly to the Basic Engine (BE) IDE bus via connector 1102.
Via connector 1101 it connects to the hard disk.
The normal recording is always done on the hard disk. Only archiving and playback is done with optical disk.

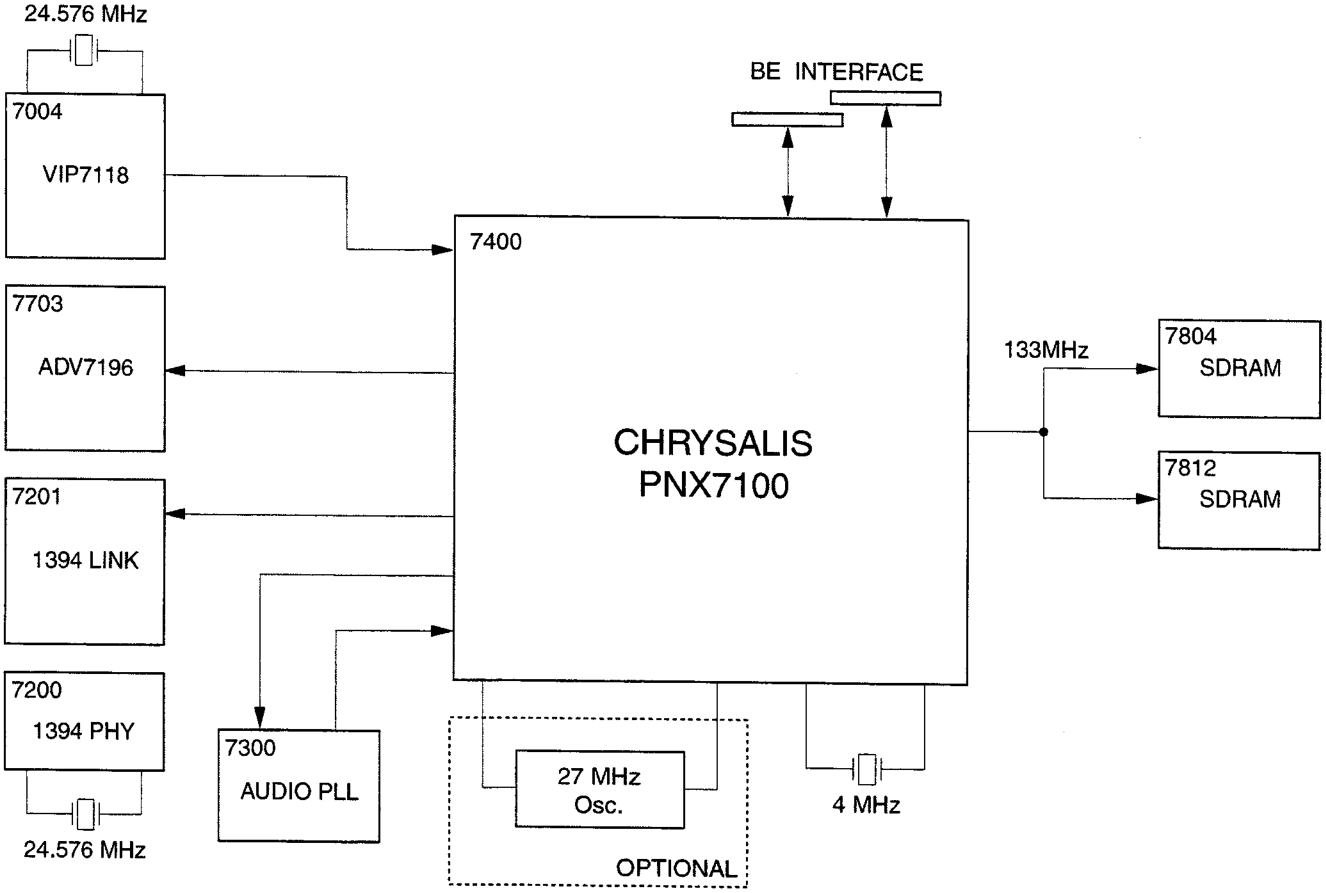
9.5.3 Playback Mode

During playback, the serial data from the Basic Engine is going directly to the PNX7100 via the serial front-end I2S interface.
The PNX7100 is an MPEG CoDec and has the following outputs:

- To the analogue board: analogue video RGB, YC, CVBS on connector 1904.
- I2S audio (PCM format) on connector 1900.
- SPDIF audio (digital audio output) on connector 1904.
- Progressive video on connector 1704.
- Communication gateway (RS232) on connector 1104.

9.5.4 Clock Distribution

Clock distribution on Chrysalis board



CL 36532004_004.eps
140203

Figure 9-6

The PNX7100 has a complex clock system, which is needed to support the processes running at different frequencies such as video decoding, audio decoding or peripheral I/O devices etc. To ensure a synchronous initialisation of all the registers and state machines, all the PLLs are switched to their default frequency and the reset sequence is run at 4 MHz. Then when the booting control unit is correctly initialized and once it has captured all the booting parameters, it sets the PLLs to its functional frequency to allow the modules to run at their nominal frequencies. Thanks to a clock blocking mechanism, the frequency switching is glitch free.

System clocks:

- PNX7100 (IC7400, pins AF9 and AF10) : 4 MHz provided by the xtal oscillator 7402.
- SAA7118 (IC7004, pins A3 and B4): 24.576 MHz provided by xtal 1001.
- ADV7196 (IC7703, pin 25): 27 MHz provided by PNX7100.
- SDRAM (IC7804 and 7808, pin 38): 133 MHz provided by the PNX7100.
- 1394-LINK (IC7201, pin 88): 49.152 MHz provided by 1394-PHY.
- 1394-PHY (IC7200, pins 59 and 60): 24.576 MHz provided by xtal 1201.

9.5.5 Power Supply

The Digital Board is not powered in standby mode. The control signal 'ION' (Inverse On), coming from the analogue board, will enable the PSU, and power the digital board.

- ION = High: the digital board is in powered down standby mode.
- ION = Low: the power supply to the digital board is enabled.

The 3V3, +5V, -5V, and +12V come from the PSU, while the 1V8 core voltage is generated on the board by a low voltage buck controller (item 7501). It provides the control for a DC-DC power solution producing an 1.8V output voltage over a wide current range. The NCP1570-based solution is powered from 12 V with the output derived from the 3V3 supply. It contains all required circuitry for a synchronous NFET (IC7500-1 and -2) buck regulator.

9.5.6 Memory

Several memories are used on the Chrysalis Digital Board:

- EEPROM IC7810: this memory contains all the necessary boot parameters of the board.
- EEPROM IC7809: this memory contains all the necessary parameters for the application.
- FLASH IC7807(05/11): this memory contains the application-, diagnosis-, and service software.

9.5.7 Reset

Reset concept Chrysalis board

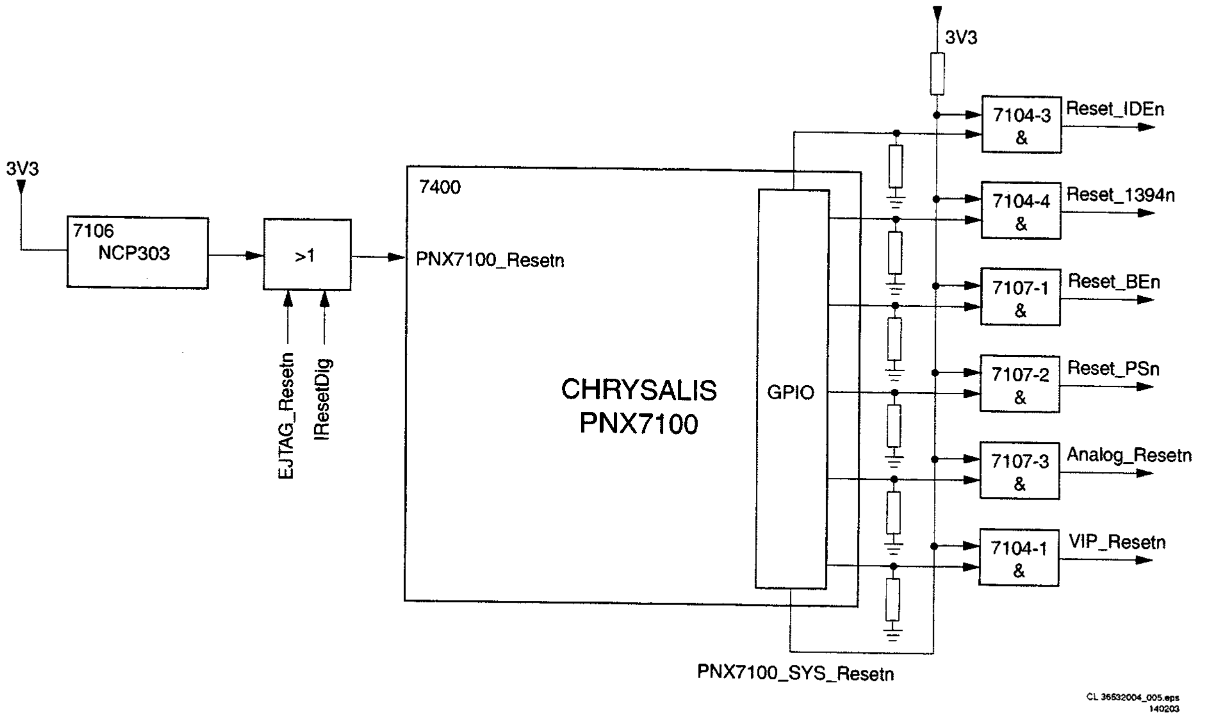


Figure 9-7

The voltage detector NCP303LSN29 (IC7600) provides the reset signal PNX7100_RESETn (active 'low') with the correct timing behavior. This circuitry functions as a Power-On Reset (POR) module, which detects the minimum functional voltage that is needed by the device. It also detects any voltage drop. When the power voltage is outside the nominal range, a reset signal is generated by the POR module and fed to the reset module which controls the individual reset of the different peripherals and processing units.
There are two control lines which can overrule this reset signal:

- IRESET_DIG (controlled by the microprocessor on the Analogue Board).
- EJTAG_RESETn (only for production).

They can pull the output of the NCP303LSN29 (item 7106) down via a shottky diode.
So when the output signal PNX7100_RESETn is 'low', the board will reset. When this signal is 'high', the board is up and running.

The PNX7100_SYS_RESETn is a general enabling signal for the different reset lines. All other reset lines are directly driven from Chrysalis port pins (e.g. MPIO13_IDE1_RESETn). All reset lines are logically connected via 74LVC08D (item 7104) and (item 7107) AND-gates. If both reset signals are low, all other external devices are initialised.

9.5.8 I2C Bus

The PNX7100 is the master of the I2C bus (during reset, external I2C masters are allowed). The following ICs are controlled by the I2C bus:

- IC7809.
- IC7810 NVRAMs.
- IC7004 VIP.
- IC7700 FLI2301 Video De-interlacer Line Doubler (for Chrysalis-F boards).
- IC7703 ADV7196 Video Enc (for progressive scan done by Chrysalis).

9.5.9 I/O Connectors

AIO Connector (item 1900)
The Audio In/Out (AIO) connector is used to interchange digital audio signals between Analog- and Digital Board.

DAIO Connector (item 1901)
The Digital Audio In/Out (DAIO) connector is used to interchange digital audio (SPDIF) signals between the IOE-Board and the Digital Board.

VIO Connector (item 1904)
The Video In/Out (VIO) connector is used to interchange analogue video signals between Analog- and Digital-Board.

9.5.10 Progressive Scan

Introduction
There are two versions foreseen, to generate a progressive scan analogue video output:

- In the standard Chrysalis board, the 'low end' progressive video output is generated by the PNX7100.
- In the Chrysalis 'F', the 'high end' progressive output is generated by the Faroudja FLI2301. This IC offers additionaly DCDi, upscaling to HDTV, and picture enhancement.

Description
The progressive scan part is integrated in the Digital Board and built around the FLI2301 de-interlace/line doubler (7701). This I2C controlled de-interlace uses a 64Mbit SDRAM (32bit x 2M) to perform high quality de-interlacing (meshing). The de-interlace gets its digital YUV input data from the PNX7100 (7400). The format of the digital YUV input to the Fli2301 is CCIR656 with separated Hsync, Vsync, and odd/even signal running on 27MHz.

9.6 Service UART Interface

Logic IC 74HCT14D (item 7111) is used to make a level conversion from microprocessor (LVTTL) to +/-5V (compatible with most RS232 interfaces) and vice versa. The control line MPIO19_CTL_SERVICE is used to activate service and diagnostic SW at start up procedure. The connectivity is provided via an external service tool.

9.7 EPG Nafta Board

9.7.1 General

Two ASICs from Gemstar, GS501 (item 7100) and GS502 (item 7201), generate the EPG OSD. The host P controls both ICs via the I2C bus (pins 45 and 48). A RAM memory (item 7102) and a Flash memory with the firmware (item 7101) belong also to the periphery of these ASICs.
A PIC processor (item 7303) generates the POR_N reset for this system. The POR_DC reset comes from the set, and is active after AC power 'on'. A port expander from the host, controls the EXT_RESET signal. This port expander (item 7200) is also used for switching the video paths on the EPG board.

Either the board works in 'Loop Trough' mode, or (for EPG) the output path is switched to the 'EPG RGB' video.

Blockdiagramm EPG-Modul Nafta

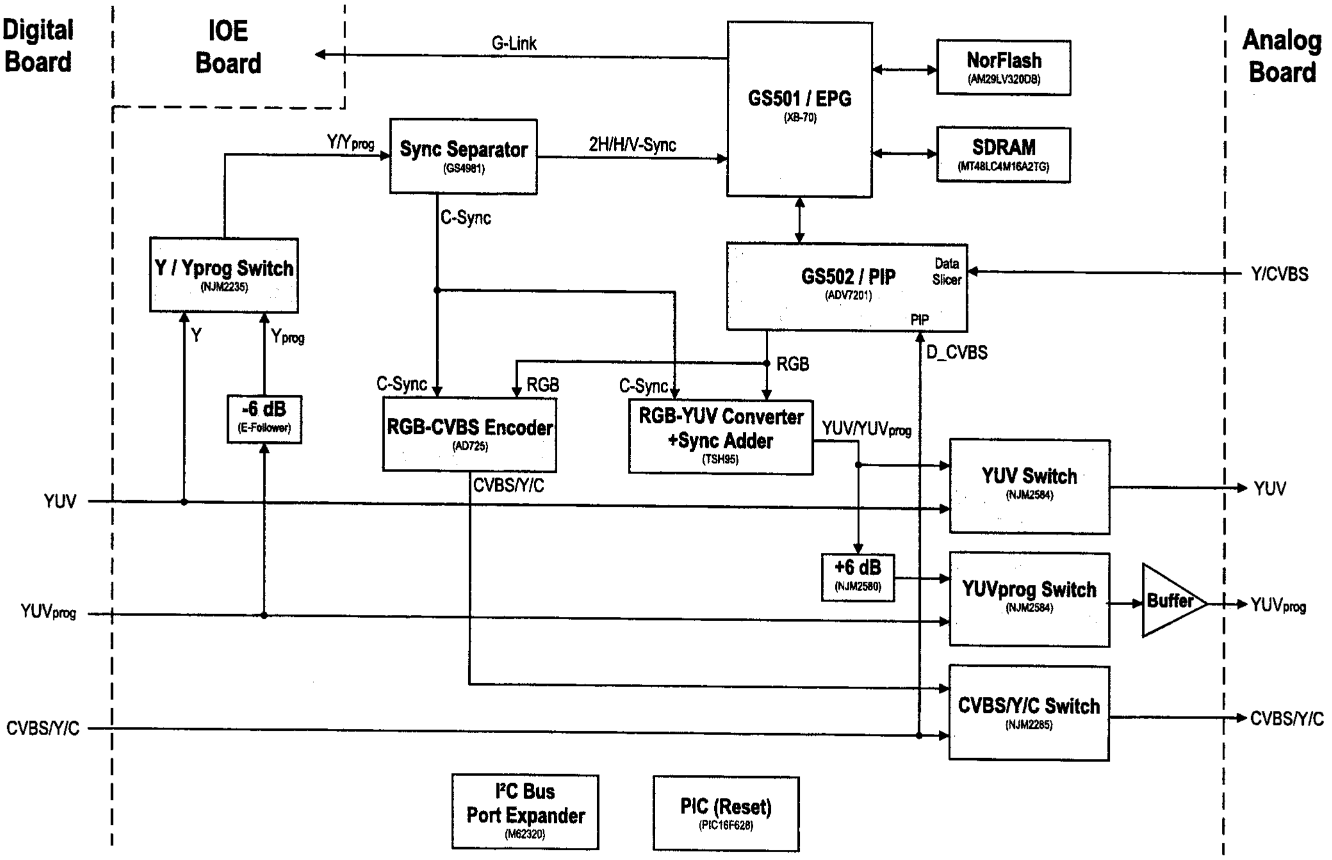

Digital Board
IOE Board
G-Link
GS501 / EPG
(XB-70)
NorFlash
(AM29LV320DB)
SDRAM
(MT48LC4M16A2TG)
Analog Board
Y/Yprog
Sync Separator
(GS4981)
2H/H/V-Sync
C-Sync
Y / Yprog Switch
(NJM2235)
GS502 / PIP
(ADV7201)
Data Slicer
PIP
Y/CVBS
Y
Yprog
RGB
D_CVBS
C-Sync
RGB
C-Sync
-6 dB
(E-Follower)
RGB-CVBS Encoder
(AD725)
RGB-YUV Converter +Sync Adder
(TSH95)
YUV/YUVprog
YUV Switch
(NJM2584)
CVBS/Y/C
YUV
YUV
+6 dB
(NJM2580)
YUVprog Switch
(NJM2584)
Buffer
YUVprog
YUVprog
CVBS/Y/C Switch
(NJM2285)
CVBS/Y/C
CVBS/Y/C
I²C Bus Port Expander
(M62320)
PIC (Reset)
(PIC16F628)

Figure 9-8

9.7.2 Loop trough

For 'Loop Trough' the input video signals (CVBS, YC, YUV, and YUV-progressive) from the Digital board are passing three video switches before going to the Analog board.

- Item 7503 for CVBS and Y/C.
- Item 7502 for YUV-interlaced.
- Item 7501 for YUV-progressive.

9.7.3 EPG RGB Video

A V-sync and H-sync (for progressive = 2H-sync) are necessary for outputting an RGB video. A sync separator (item 7703) generates these syncs. Input for the sync separator is either the 1fh or the 2fh luminance signal from the Digital board. A video switch (item 7700) makes the selection. For progressive video, the signal must be attenuated (item 7701).

The RGB signal goes via emitter followers (items 7202, 7203, and 7204) to an RGB-to-YUV converter and to an RGB-to-CVBS, Y/C converter.
The RGB-to-YUV converter consists of four OpAmp's, which are necessary for RGB/YUV conversion (item 7600-B, -C, and -D) and for adding the C-sync to the Y signal (item 7600-A).
The RGB-to-CVBS, Y/C conversion is realized by IC7602. The oscillator (item 7601) is necessary for generating the chroma carrier.
With transistor 7603 the conversion stages can be switched 'off' for power saving.

For the PIP (Picture in Picture) feature, the D_CVBS video signal from the Digital board is used. This signal is fed to Pin 10 of IC7201. For scanning the EPG data, the A_YCVBS signal from the Analogue board is fed to pin 8 of IC7201.

9.7.4 Power supply

The supply for the video stages and the EPG digital part, are generated via DC-DC converters (items 7400, 7401, and 7403) out of the 12STBY.

9.8 EPG Europe Board

9.8.1 General

The ARM7 based microprocessor (item U1) and an ASIC (Gemstar GSA03, item U2) generates the EPG OSD data (RGB or YUV-interl./progr.). The host P on the Digital board, controls both ICs via the I2C bus. A RAM memory (item U7) and two Flash memories (items U8 and U9) with the firmware and EPG data, belong also to the periphery of the ASIC.
A resistor and capacitor (items R1 and C6) generate the reset for this system. The IPOR reset comes from the set and is active after main power 'on'. A port expander from the host, controls the nGCLR reset signal. This port expander (item U31) is also used for switching the video paths on the EPG board.

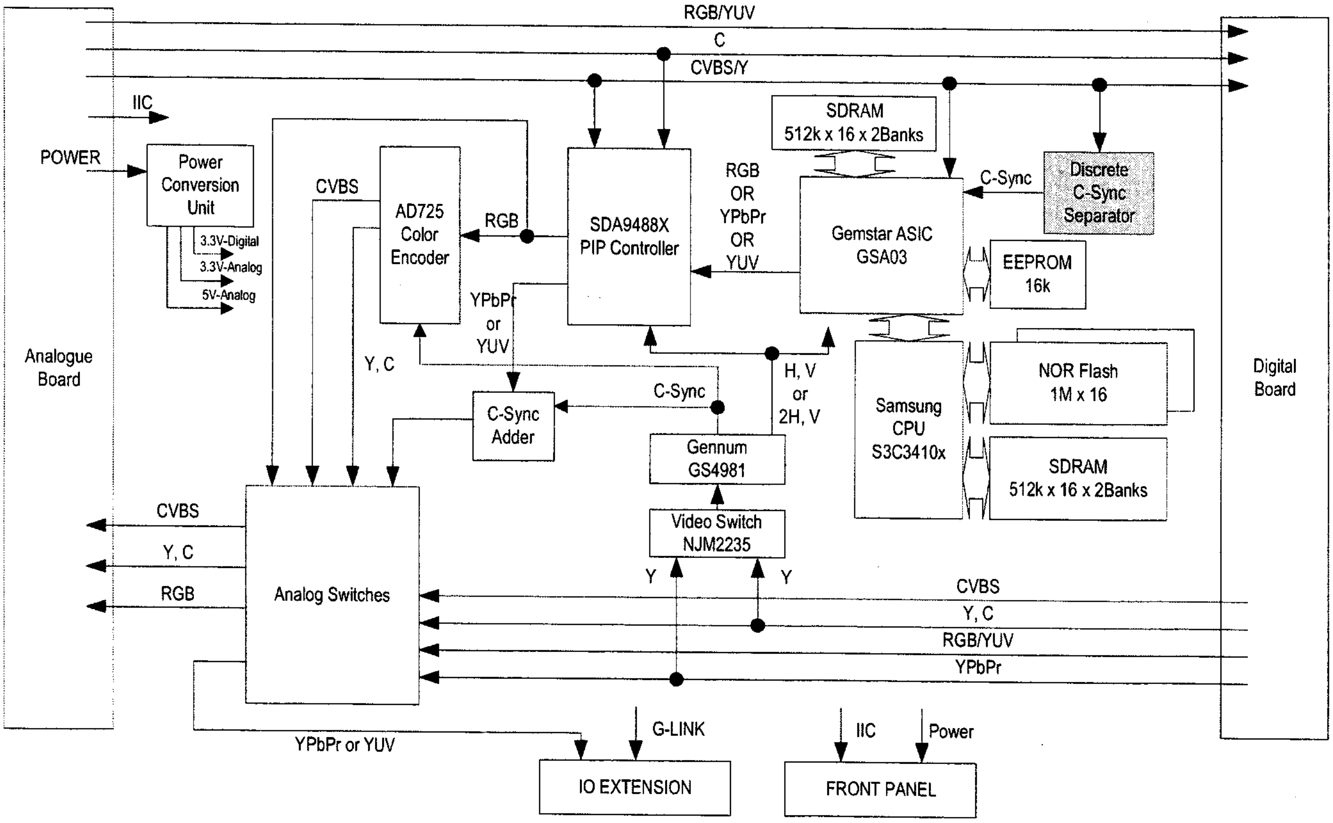

RGB/YUV
C
CVBS/Y
IIC
POWER
Power Conversion Unit
3.3V-Digital
3.3V-Analog
5V-Analog
CVBS
AD725 Color Encoder
RGB
SDA9488X PIP Controller
RGB OR YPbPr OR YUV
SDRAM 512k x 16 x 2Banks
Gemstar ASIC GSA03
C-Sync
Discrete C-Sync Separator
EEPROM 16k
YPbPr or YUV
Y, C
C-Sync Adder
C-Sync
H, V or 2H, V
Gennum GS4981
Samsung CPU S3C3410x
NOR Flash 1M x 16
SDRAM 512k x 16 x 2Banks
Analogue Board
Digital Board
Video Switch NJM2235
Y
Y
CVBS
Y, C
RGB
Analog Switches
CVBS
Y, C
RGB/YUV
YPbPr
G-LINK
IIC
Power
YPbPr or YUV
IO EXTENSION
FRONT PANEL

Figure 9-9

Either the board works in 'Loop Trough' mode, or (for EPG) the output path is switched to the 'EPG RGB' video.

9.8.2 Loop Trough

For 'Loop Trough', the input video signals (CVBS, YC, RGB, YUV-interlaced, and YUV-progressive) from the digital board are passing three video switches before going to the Analogue board.

- Item U15 for CVBS and Y/C selection between EPG and Loop trough.
- Items U16, U18, and U19 (and periphery) for RGB selection between EPG and Loop trough.
- Items U42 and U17 for YUV-interlaced and YUV-progressive selection between EPG and Loop trough. These signals are amplified (items U13B, C, and D) for driving a 75-Ohm output.

Note: RGB and YUV-interlaced (VR_DVD, UB_DVD, YG_DVD) are the same signals. It depends on the software, which signal is chosen.

9.8.3 EPG RGB

A V-sync and H-sync (for progressive = 2H-sync) are necessary for outputting an EPG video. A sync separator (item U10) generates these syncs. Input for the sync separator is either the 1fh or the 2fh luminance signal from the Digital board. A video switch (item U50) makes the selection.

The EPG signal goes via a PIP-inserter IC (item U11 and pheripherals) that inserts a PIP (Picture In Picture) into the EPG OSD. Source for this PIP is the CVBS signal from the digital board.
When the PIP output is a YUV signal, the Y signal is without a sync. Therefore, this sync must is added with item U13A.

For RGB-to-CVBS, Y/C conversion is realized by a PAL conversion IC (item U14). The oscillator (item Y5) is necessary for generating the chroma carrier.

For scanning EPG data, the A_YCVBS signal from the Analog board is used. This signal is fed to pin 189 of item U2.
There is also a sync from the Analog board necessary. A discrete circuit (items Q18-Q23 and periphery) generates it.

9.8.4 Power supply

The supply for the video stages and the EPG digital part are generated via DC-DC converters and linear regulators (items U28, U40, and U41) out of the 12VSTBY.

9.9 I/O Extension Board

This board feeds the internal S/PDIF signal from the Digital board to an optical and/or digital out connector. For European players, also an YUV output is present on this board.

9.10 IC Descriptions

9.10.1 Display Board

IC 7103 TMP87CH74F Display Board, Front Microprocessor

Block Diagram

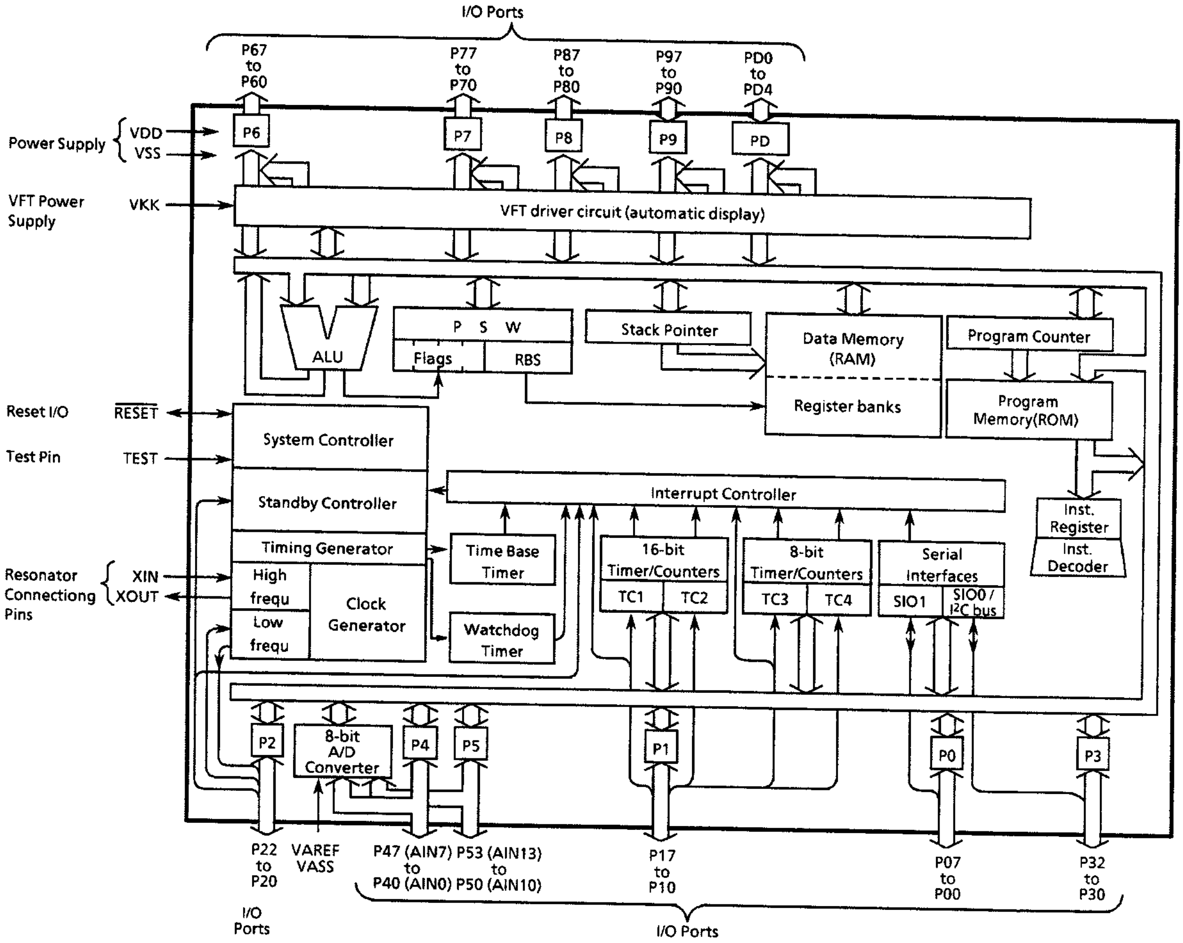

I/O Ports
P67 to P60
P77 to P70
P87 to P80
P97 to P90
PD0 to PD4
Power Supply
VDD
VSS
P6
P7
P8
P9
PD
VFT Power Supply
VKK
VFT driver circuit (automatic display)
ALU
P S W
Flags
RBS
Stack Pointer
Data Memory (RAM)
Register banks
Program Counter
Program Memory(ROM)
Reset I/O
RESET
Test Pin
TEST
System Controller
Standby Controller
Timing Generator
Interrupt Controller
Inst. Register
Inst. Decoder
Resonator Connectiong Pins
XIN
XOUT
High frequ
Low frequ
Clock Generator
Time Base Timer
Watchdog Timer
16-bit Timer/Counters
TC1
TC2
8-bit Timer/Counters
TC3
TC4
Serial Interfaces
SIO1
SIO0 / I2C bus
P2
8-bit A/D Converter
P4
P5
P1
P0
P3
P22 to P20
VAREF VASS
P47 (AIN7) to P40 (AIN0)
P53 (AIN13) to P50 (AIN10)
P17 to P10
P07 to P00
P32 to P30
I/O Ports
I/O Ports

Figure 9-10

Pin Function

Pin Name	Input / Output	Function	
P07 to P03	I/O	Two 8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a SIO input/output, an External interrupt input, a timer/counter input, the latch must be set to "0". When used as a PPG output or divider output, the latch must be set to "1".	
P02 (SO1)	I/O (Output)		SIO1 serial data Output
P01 (SI1)	I/O (Input)		SIO1 serial data Input
P00 ($\overline{\text{SCK1}}$)	I/O (I/O)		SIO1 serial clock input/output
P17 (INT4/TC3)	I/O (Input)		External interrupt input 4 or Timer/Counter 3 input
P16 (INT2)			External interrupt input 2
P15 (INT3/TC1)			External interrupt input 3 or Timer/Counter 1 input
P14 (TC4/$\overline{\text{PDO}}$/$\overline{\text{PWM}}$)	I/O (I/O)		Timer counter 4 input or 8-bit programmable divider output or 8-bit PWM output
P13 ($\overline{\text{DVO}}$)	I/O (Output)		Divider output
P12 (TC2/$\overline{\text{PPG}}$)	I/O (I/O)		Timer counter 2 input or Programmable pulse generator output
P11 (INT1)	I/O (Input)		External interrupt input 1
P10 ($\overline{\text{INT0}}$)			External interrupt input 0
P22 (XTOUT)	I/O (Output)	3-bit input/output port with latch. When used as input port, or external interrupt input, STOP mode release signal input, the latch must be set to "1".	Resonator connecting pins (32.768 kHz). For inputting external clock, XTIN is used and XTOUT is opened.
P21 (XTIN)	I/O (Input)		
P20 ($\overline{\text{INT5}}$/$\overline{\text{STOP}}$)			External interrupt input 5 or STOP mode release signal input
P32 ($\overline{\text{SCK0}}$)	I/O (I/O)	3-bit programmable input/output ports (Sink open drain). Each bit of these ports can be individually configured as an input or an output under software control. When used as a I²C input/output, the latch must be set to "1".	SIO0 serial clock input/output
P31 (SDA/SO0)	I/O (I/O/Output)		I²Cbus serial data input/output or SIO0 serial data output
P30 (SCL/SI0)	I/O (I/O/Input)		I²Cbus serial clock input/output or SIO0 serial data Input
P47 (AIN7) to P40 (AIN0)	I/O (Input)	8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P4CR must be set to "0".	A/D converter analog inputs
P53 (AIN13) to P50 (AIN10)	I/O (Input)	4-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P5CR must be set to "0".	A/D converter analog inputs
P67 (V7) to P60 (V0)	I/O (Output)	Four 8-bit high brackdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	VFT driver outputs
P77 (V15) to P70 (V8)			
P87 (V23) to P80 (V16)			
P97 (V31) to P90 (V24)			
PD4 (V36) toPD0 (V32)	I/O (Output)	5-bit high breakdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	

Figure 9-11

Pin Name	Input / Output	Function
XIN, XOUT	Input, Output	Resonator connecting pins for high-frequency clock. For inputting external clock, XIN is used and XOUT is opened.
$\overline{\text{RESET}}$	I/O	Reset signal input or watchdog timer output/address-trap-reset output/system-clock-reset outputted.
TEST	Input	Test pin for out-going test. Be tied to low.
VDD, VSS	Power Supply	+5 V, 0 V (GND)
VKK		VFT driver power supply
VAREF, VASS		Analog reference voltage inputs (High, Low)

Figure 9-12

9.10.2IC's Analog Board

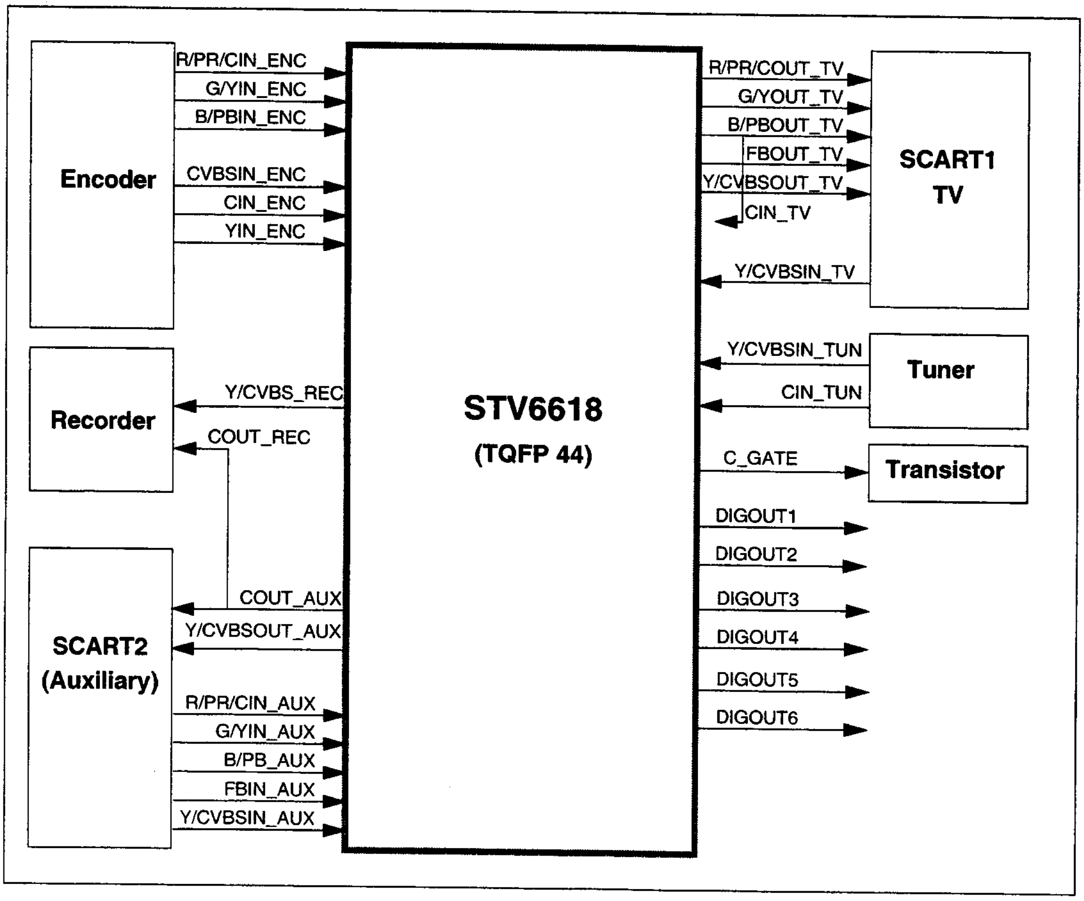
IC7408: STV6618 Analog Board, Video Switch Matrix

1.2 Pin Description

Pin No.	Symbol	Description
1	Y/CVBSIN_TUN	Y/CVBS Input from Tuner
2	DIGOUT3	Digital Output Pin 3
3	GND1	Ground Supply 1 for Video Inputs
4	CVBSIN_ENC	CVBS Input from Encoder
5	DECV	Video decoupling capacitor
6	CIN_ENC	Chroma Input from Encoder
7	YIN_ENC	Y Input from Encoder
8	V_{CC}	+5 V Power Supply for Video Inputs
9	R/PR/CIN_ENC	Red or Pr or Chroma Input from Encoder
10	G/YIN_ENC	Green or Y Input from Encoder
11	B/PBIN_ENC	Blue or Pb Input from Encoder
12	GND2	Ground Supply 2 for Video Inputs
13	B/PBIN_AUX	Blue or Pb Input from Auxiliary (SCART2 or external Cinch)
14	DIGOUT4	Digital Output Pin 4
15	G/YIN_AUX	Green or Y Input from Auxiliary (SCART2 or external Cinch)
16	DIGOUT5	Digital Output Pin 5
17	R/PR/CIN_AUX	Red or Pr or Chroma input from Auxiliary (SCART2 or external Cinch)
18	DIGOUT6	Digital Output Pin 6
19	Y/CVBSIN_AUX	Y/CVBS Input from Auxiliary (SCART2 or external Cinch)
20	VCCB_REC	Video Output Recorder Buffer Supply Pin
21	Y/CVBSOUT_REC	Y/CVBS Output to Recorder
22	GNDB_REC	Ground Supply for Recorder Buffer
23	COUT_AUX	Chroma Output to Auxiliary (SCART2 or external Cinch)
24	VCCB1	Video Output Buffer Supply Pin
25	Y/CVBSOUT_AUX	Y/CVBS Output to Auxiliary (SCART2 or external Cinch)
26	GNDB	Ground Supply for Video Buffer
27	B/PBOUT_TV	Blue or Pb Output to TV (SCART1 or external Cinch)
28	C_GATE	External Transistor Command for Bidirectinnal B/C SCART I/O
29	G/YOUT_TV	Green or Y Output to TV (SCART1 or external Cinch)
30	VCCB2	Video Buffer
31	R/PR/COUT_TV	Red or Pr or Chroma Output to TV (SCART1 or external Cinch)
32	VCCB3	Video Output Buffer Supply Pin
33	Y/CVBSOUT_TV	Y/CVBS Output to TV (SCART1 or external Cinch)
34	FBOUT_TV	Fast Blanking Output to TV (SCART1)
35	FBIN_AUX	Fast Blanking Input from Auxiliary (SCART2)

Pin No.	Symbol	Description
36	VDD	+5 V Digital Power Supply
37	SCL	I²C Bus Clock
38	SDA	I²C Bus Data
39	GNDD	Digital Ground Supply
40	CIN_TV	Chroma Input from TV (SCART1 or external Cinch)
41	Y/CVBSIN_TV	Y/CVBS Input from TV (SCART1 or external Cinch)
42	DIGOUT1	Digital Output Pin 1
43	CIN_TUN	Chroma Input from Tuner
44	DIGOUT2	Digital Output Pin 2

Figure 2: STV6618 Input/Output Diagram


Encoder
R/PR/CIN_ENC
G/YIN_ENC
B/PBIN_ENC
CVBSIN_ENC
CIN_ENC
YIN_ENC
Recorder
Y/CVBS_REC
COUT_REC
SCART2
(Auxiliary)
COUT_AUX
Y/CVBSOUT_AUX
R/PR/CIN_AUX
G/YIN_AUX
B/PB_AUX
FBIN_AUX
Y/CVBSIN_AUX
STV6618
(TQFP 44)
R/PR/COUT_TV
G/YOUT_TV
B/PBOUT_TV
FBOUT_TV
Y/CVBSOUT_TV
CIN_TV
Y/CVBSIN_TV
SCART1
TV
Y/CVBSIN_TUN
CIN_TUN
Tuner
C_GATE
Transistor
DIGOUT1
DIGOUT2
DIGOUT3
DIGOUT4
DIGOUT5
DIGOUT6

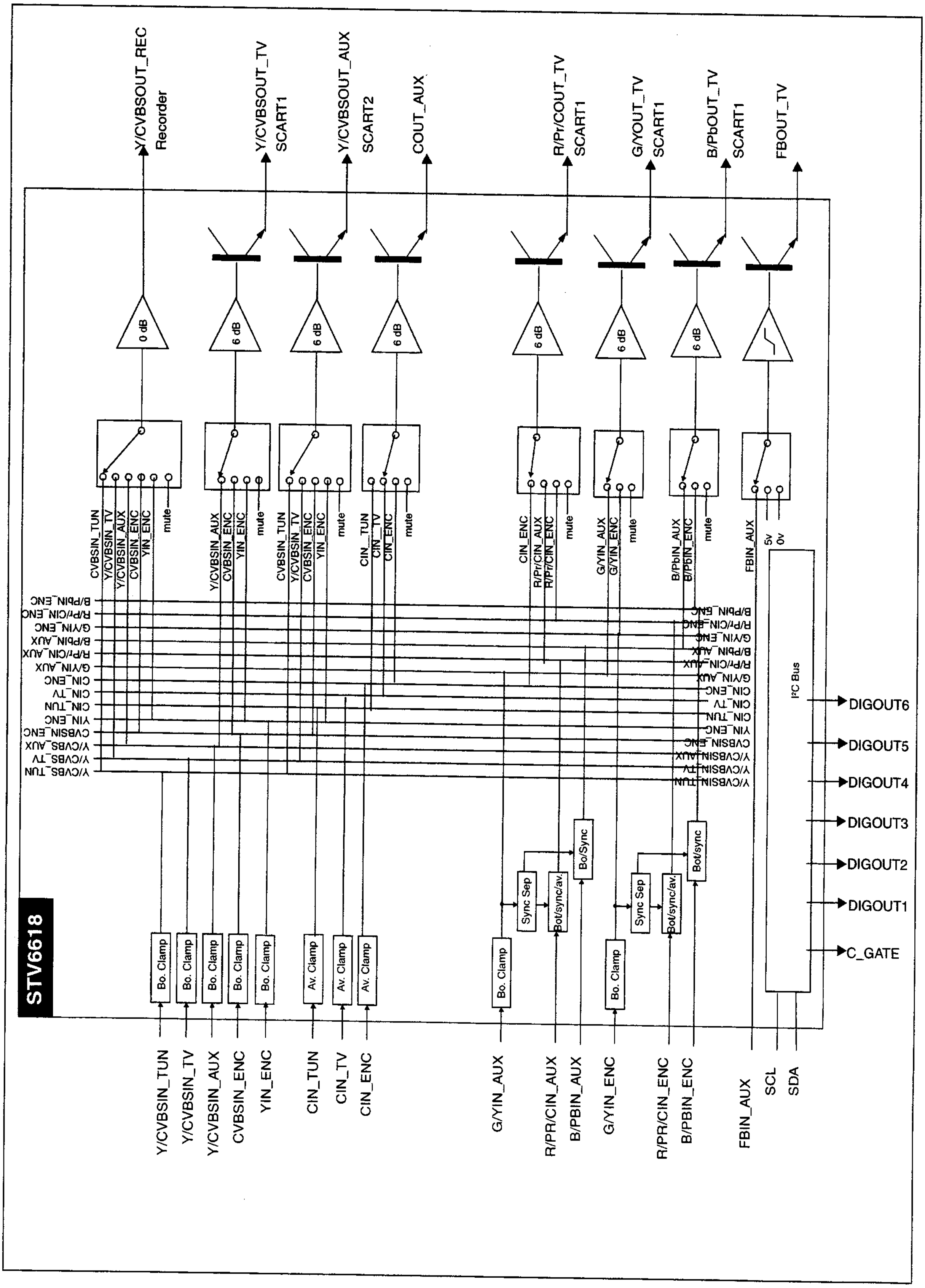
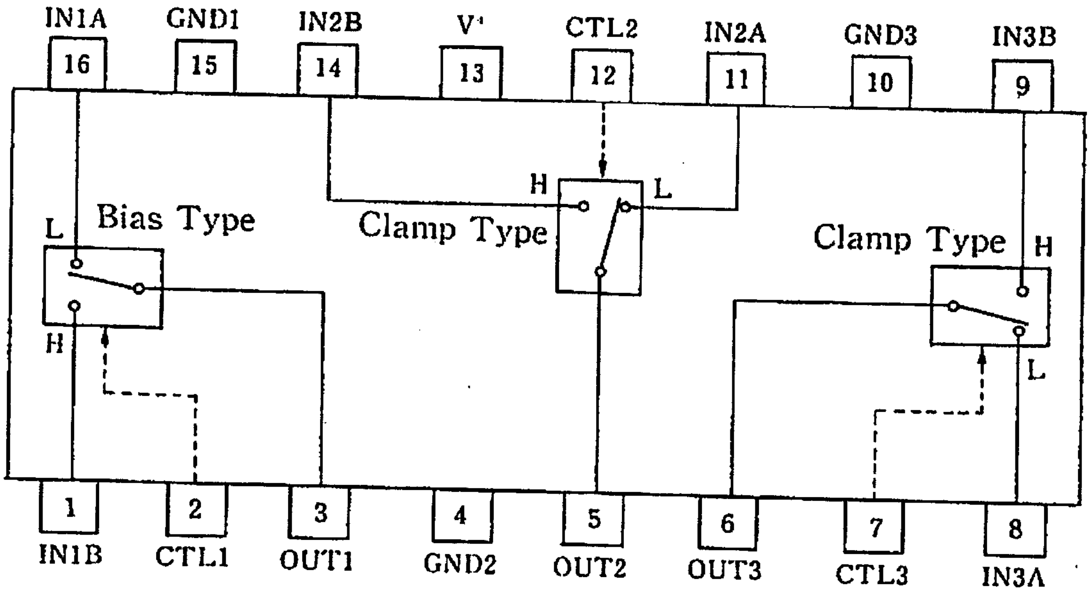

STV6618
Y/CVBSOUT_REC
Recorder
Y/CVBSOUT_TV
SCART1
Y/CVBSOUT_AUX
SCART2
COUT_AUX
R/Pr/COUT_TV
SCART1
G/YOUT_TV
SCART1
B/PbOUT_TV
SCART1
FBOUT_TV
0 dB
6 dB
CVBSIN_TUN
Y/CVBSIN_TV
Y/CVBSIN_AUX
CVBSIN_ENC
YIN_ENC
mute
CIN_TUN
CIN_TV
CIN_ENC
R/Pr/CIN_AUX
R/Pr/CIN_ENC
G/YIN_AUX
G/YIN_ENC
B/PbIN_AUX
B/PbIN_ENC
FBIN_AUX
5v
0v
I²C Bus
DIGOUT6
DIGOUT5
DIGOUT4
DIGOUT3
DIGOUT2
DIGOUT1
C_GATE
Bo. Clamp
Av. Clamp
Sync Sep
Bot/sync/av.
Bo/Sync
Bot/sync
Y/CVBSIN_TUN
Y/CVBSIN_TV
Y/CVBSIN_AUX
CVBSIN_ENC
YIN_ENC
CIN_TUN
CIN_TV
CIN_ENC
G/YIN_AUX
R/PR/CIN_AUX
B/PBIN_AUX
G/YIN_ENC
R/PR/CIN_ENC
B/PBIN_ENC
FBIN_AUX
SCL
SDA

Figure 3: STV6618 Block Diagram

IC7411: NJM2285 Analog Board, Video Switch


IN1A
GND1
IN2B
V+
CTL2
IN2A
GND3
IN3B
16
15
14
13
12
11
10
9
Bias Type
Clamp Type
Clamp Type
L
H
H
L
H
L
1
2
3
4
5
6
7
8
IN1B
CTL1
OUT1
GND2
OUT2
OUT3
CTL3
IN3A

NJM2285D
NJM2285M
NJM2285V

IC7313 TEA 1507 Analog Board, Power Supply Control

BLOCK DIAGRAM

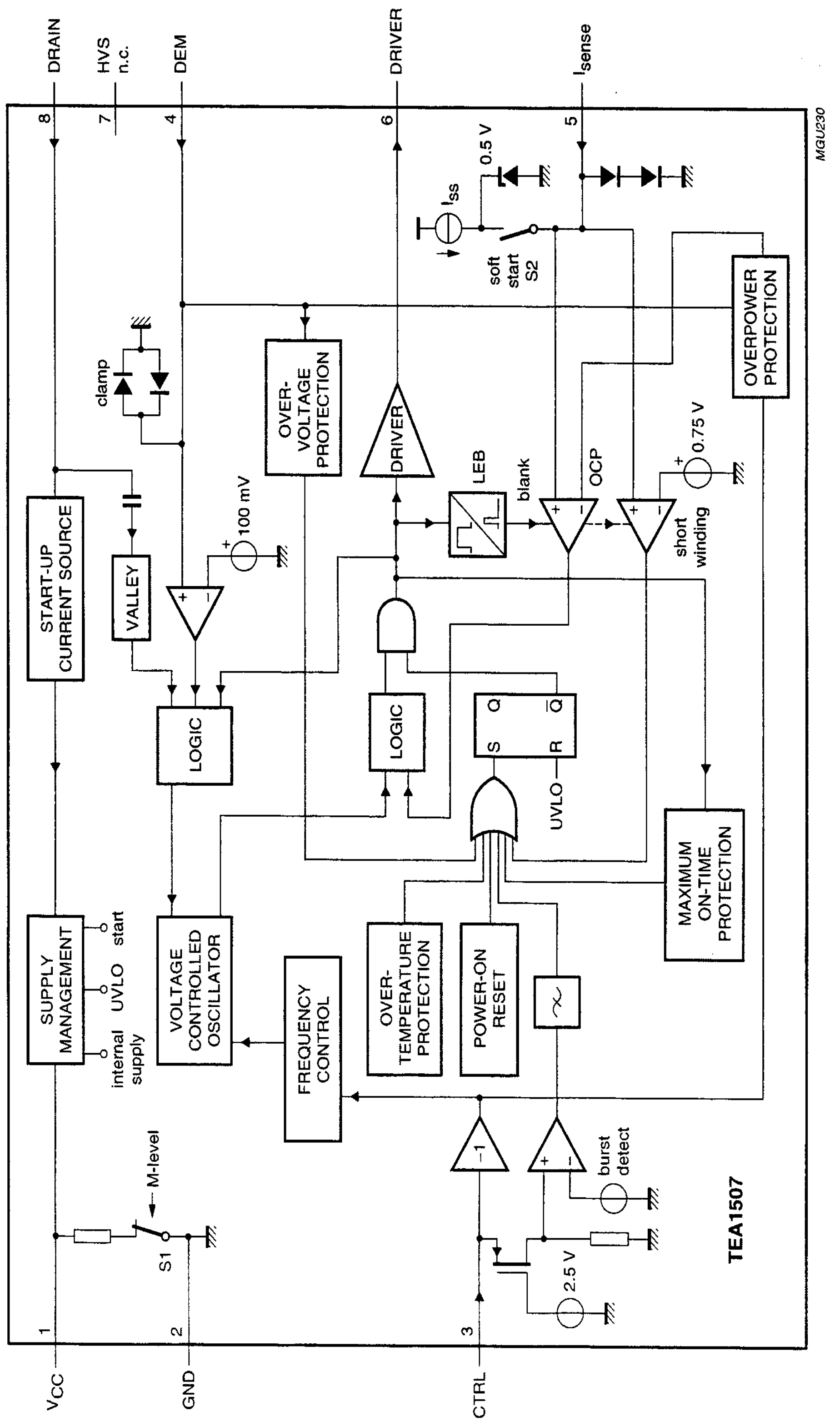
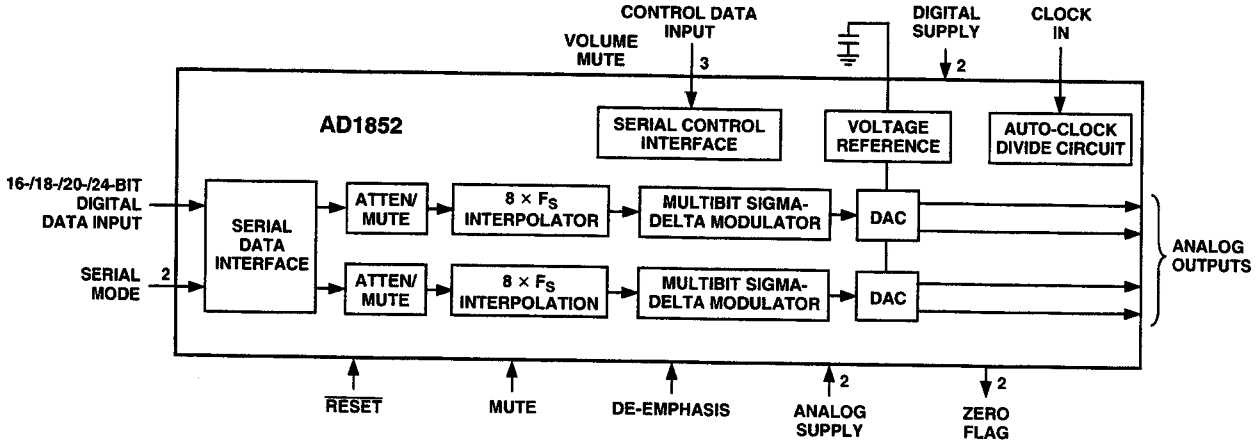

DRAIN
HVS
n.c.
DEM
DRIVER
I_sense
8
7
4
6
5
MGU230
0.5 V
I_SS
soft
start
S2
clamp
OVER-
VOLTAGE
PROTECTION
OVERPOWER
PROTECTION
DRIVER
LEB
blank
OCP
0.75 V
short
winding
START-UP
CURRENT SOURCE
VALLEY
100 mV
LOGIC
LOGIC
Q
Q̄
S
R
UVLO
MAXIMUM
ON-TIME
PROTECTION
SUPPLY
MANAGEMENT
internal
supply
UVLO
start
VOLTAGE
CONTROLLED
OSCILLATOR
FREQUENCY
CONTROL
OVER-
TEMPERATURE
PROTECTION
POWER-ON
RESET
-1
burst
detect
M-level
S1
2.5 V
TEA1507
1
2
3
V_CC
GND
CTRL

Fig.2 Block diagram.

IC7404: AD1582 Analog Board, Digital/Analogue Converter

FUNCTIONAL BLOCK DIAGRAM


CONTROL DATA INPUT
VOLUME MUTE
3
DIGITAL SUPPLY
2
CLOCK IN
AD1852
SERIAL CONTROL INTERFACE
VOLTAGE REFERENCE
AUTO-CLOCK DIVIDE CIRCUIT
16-/18-/20-/24-BIT DIGITAL DATA INPUT
SERIAL MODE
2
SERIAL DATA INTERFACE
ATTEN/ MUTE
8 × F$_S$ INTERPOLATOR
MULTIBIT SIGMA-DELTA MODULATOR
DAC
ATTEN/ MUTE
8 × F$_S$ INTERPOLATION
MULTIBIT SIGMA-DELTA MODULATOR
DAC
ANALOG OUTPUTS
RESET
MUTE
DE-EMPHASIS
2
ANALOG SUPPLY
2
ZERO FLAG

AD1852

PIN FUNCTION DESCRIPTIONS

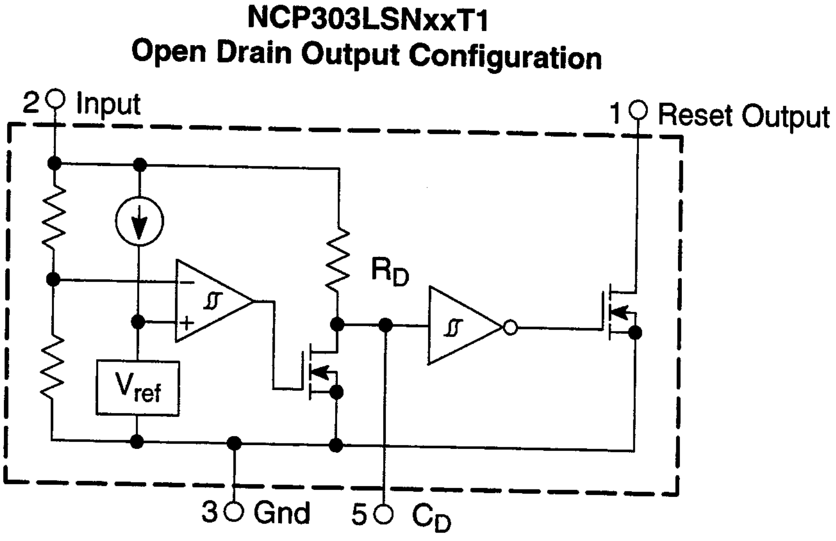
Pin	Input/Output	Pin Name	Description
1	I	DGND	Digital Ground.
2	I	MCLK	Master Clock Input. Connect to an external clock source at either 256 F_S, 384 F_S, 512 F_S, 768 F_S, or 1024 F_S.
3	I	CLATCH	Latch Input for Control Data. This input is rising-edge sensitive.
4	I	CCLK	Control Clock Input for Control Data. Control input data must be valid on the rising edge of CCLK. CCLK may be continuous or gated.
5	I	CDATA	Serial Control Input, MSB first, containing 16 bits of unsigned data per channel. Used for specifying channel-specific attenuation and mute.
6		NC	No Connect.
7	I	192/$\overline{48}$	Selects 48 kHz (LO) or 192 kHz Sample Frequency.
8	O	ZEROR	Right Channel Zero Flag Output. This pin goes HI when Right Channel has no signal input for more than 1024 LR Clock Cycles.
9	I	DEEMP	De-Emphasis. Digital de-emphasis is enabled when this input signal is HI. This is used to impose a 50 µs/15 µs response characteristic on the output audio spectrum at an assumed 44.1 kHz sample rate. Curves for 32 kHz and 48 kHz sample rates may be selected via SPI control register.
10	I	96/$\overline{48}$	Selects 48 kHz (LO) or 96 kHz Sample Frequency.
11, 15	I	AGND	Analog Ground.
12	O	OUTR+	Right Channel Positive Line Level Analog Output.
13	O	OUTR–	Right Channel Negative Line Level Analog Output.
14	O	FILTR	Voltage Reference Filter Capacitor Connection. Bypass and decouple the voltage reference with parallel 10 µF and 0.1 µF capacitors to the AGND.
16	O	OUTL–	Left Channel Negative Line Level Analog Output.
17	O	OUTL+	Left Channel Positive Line Level Analog Output.
18	I	AVDD	Analog Power Supply. Connect to Analog 5 V Supply.
19		FILTB	Filter Capacitor Connection. Connect 10 µF capacitor to AGND (Pin 15).
20	I	IDPM1	Input Serial Data Port Mode Control One. With IDPM0, defines 1 of 4 serial modes.
21	I	IDPM0	Input Serial Data Port Mode Control Zero. With IDPM1, defines 1 of 4 serial modes.
22	O	ZEROL	Left Channel Zero Flag Output. This pin goes HI when Left Channel has no signal input for more than 1024 LR Clock Cycles.
23	I	MUTE	Mute. Assert HI to mute both stereo analog outputs. Deassert LO for normal operation.
24	I	$\overline{\text{RESET}}$	Reset. The AD1852 is reset on the rising edge of this signal. The serial control port registers are reset to the default values. Connect HI for normal operation.
25	I	L/$\overline{\text{R}}$CLK	Left/$\overline{\text{Right}}$ Clock Input for Input Data. Must run continuously.
26	I	BCLK	Bit Clock Input for Input Data. Need not run continuously; may be gated or used in a burst fashion.
27	I	SDATA	Serial Input, MSB first, containing two channels of 16, 18, 20, and 24 bits of twos complement data per channel.
28	I	DVDD	Digital Power Supply Connect to digital 5 V supply.

Table I. Serial Data Input Mode

IDPM1 (Pin 20)	IDPM0 (Pin 21)	Serial Data Input Format
0	0	Right-Justified
0	1	I^2S-Compatible
1	0	Left-Justified
1	1	DSP

9.10.3 ICs Digital Board Chrysalis

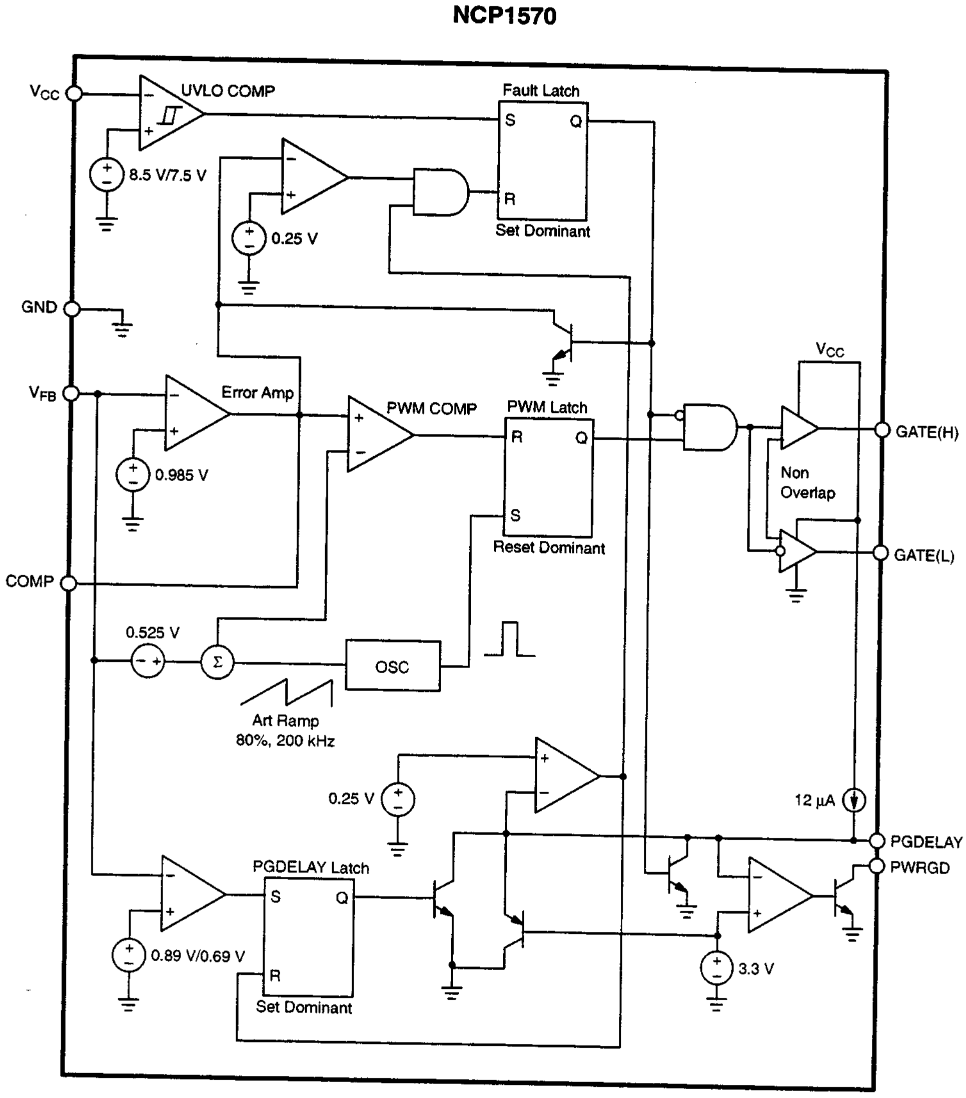
IC7106 NCP303LSN29, Digital Board 2.1 Chrysalis, Reset Circuit



NCP303LSNxxT1
Open Drain Output Configuration

2 Input
1 Reset Output
RD
Vref
3 Gnd
5 CD

IC7501 NCP1570D, Digital Board 2.1 Chrysalis, DC/DC Converter Control



NCP1570

VCC
UVLO COMP
8.5 V/7.5 V
Fault Latch
S
Q
R
Set Dominant
0.25 V
GND
VFB
Error Amp
0.985 V
PWM COMP
PWM Latch
R
Q
S
Reset Dominant
VCC
GATE(H)
Non Overlap
GATE(L)
COMP
0.525 V
Σ
OSC
Art Ramp 80%, 200 kHz
0.25 V
12 μA
PGDELAY
PWRGD
PGDELAY Latch
S
Q
R
Set Dominant
0.89 V/0.69 V
3.3 V

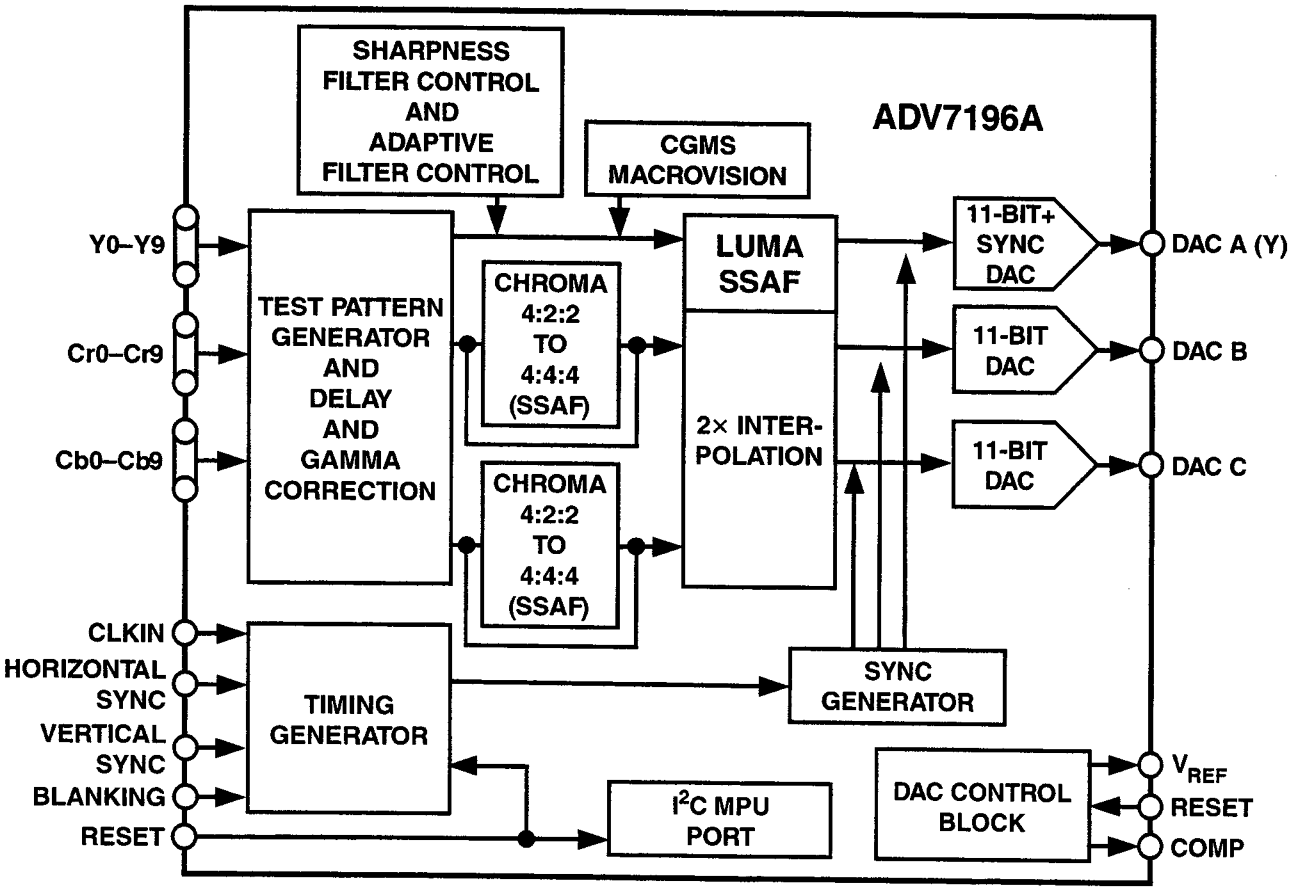
Figure 2. Block Diagram

PACKAGE PIN DESCRIPTION

PACKAGE PIN # SO–8	PIN SYMBOL	FUNCTION
1	V_{CC}	Power supply input.
2	PWRGD	Open collector output goes low when V_{FB} is out of regulation. User must externally limit current into this pin to less than 20 mA.
3	PGDELAY	External capacitor programs PWRGD low–to–high transition delay.
4	COMP	Error amp output. PWM comparator reference input. A capacitor to LGND provides error amp compensation and Soft Start. Pulling pin < 0.45 locks gate outputs to a zero percent duty cycle state.
5	GATE(H)	High–side switch FET driver pin. Capable of delivering peak currents of 1.5 A.
6	GATE(L)	Low–side synchronous FET driver pin. Capable of delivering peak currents of 1.5 A.
7	V_{FB}	Error amplifier and PWM comparator input.
8	GND	Power supply return.

IC7703 ADV7196A, Digital Board 2.1 Chrysalis, Progressive Scan Video Encoder

FUNCTIONAL BLOCK DIAGRAM


ADV7196A
SHARPNESS FILTER CONTROL AND ADAPTIVE FILTER CONTROL
CGMS MACROVISION
Y0–Y9
Cr0–Cr9
Cb0–Cb9
TEST PATTERN GENERATOR AND DELAY AND GAMMA CORRECTION
CHROMA 4:2:2 TO 4:4:4 (SSAF)
CHROMA 4:2:2 TO 4:4:4 (SSAF)
LUMA SSAF
2× INTER-POLATION
11-BIT+ SYNC DAC
11-BIT DAC
11-BIT DAC
DAC A (Y)
DAC B
DAC C
CLKIN
HORIZONTAL SYNC
VERTICAL SYNC
BLANKING
RESET
TIMING GENERATOR
SYNC GENERATOR
I²C MPU PORT
DAC CONTROL BLOCK
VREF
RESET
COMP

ADV7196A

PIN FUNCTION DESCRIPTIONS

Pin	Mnemonic	Input/Output	Function
1, 12	V_{DD}	P	Digital Power Supply
2–11	Y0–Y9	I	10-Bit Progressive Scan/HDTV Input Port for Y Data. Input for G data when RGB data is input.
13, 52	GND	G	Digital Ground
14–23	Cr0–Cr9	I	10-Bit Progressive Scan/HDTV Input Port for Color Data in 4:4:4 Input Mode. In 4:2:2 mode this input port is not used. Input port for R data when RGB data is input.
24, 35	V_{AA}	P	Analog Power Supply
25	CLKIN	I	Pixel Clock Input. Requires a 27 MHz reference clock for standard operation in Progressive Scan Mode or a 74.25 MHz (74.1758 MHz) reference clock in HDTV mode.
26, 33	AGND	G	Analog Ground
27	DV	I	Video Blanking Control Signal Input
28	$\overline{\text{VSYNC}}$/ TSYNC	I	$\overline{\text{VSYNC}}$, Vertical Sync Control Signal Input or TSYNC Input Control Signal in Async Timing Mode
29	$\overline{\text{HSYNC}}$/ $\overline{\text{SYNC}}$	I	$\overline{\text{HSYNC}}$, Horizontal Sync Control Signal Input or $\overline{\text{SYNC}}$ Input Control Signal in Async Timing Mode
30	SCL	I	MPU Port Serial Interface Clock Input
31	SDA	I/O	MPU Port Serial Data Input/Output
32	DAC C	O	Color Component Analog Output of Input Data on Cb/Cr9–0 Input Pins
34	DAC A	O	Y Analog Output
36	DAC B	O	Color Component Analog Output of Input Data on Cr9–Cr0 Input Pins
37	COMP	O	Compensation Pin for DACs. Connect 0.1 µF capacitor from COMP pin to V_{AA}.
38	R_{SET}	I	A 2470 Ω resistor (for input ranges 64–940 and 64–960; output standards EIA-770.1-EIA-770.3) must be connected from this pin to ground and is used to control the amplitudes of the DAC outputs. For input ranges 0–1023 (output standards RS-170, RS-343A) the R_{SET} value must be 2820 Ω.
39	V_{REF}	I/O	Optional External Voltage Reference Input for DACs or Voltage Reference Output (1.235 V)
40	$\overline{\text{RESET}}$	I	This input resets the on-chip timing generator and sets the ADV7196A into Default Register setting. Reset is an active low signal.
41	ALSB	I	TTL Address Input. This signal sets up the LSB of the MPU address. When this pin is tied high, the I^2C filter is activated which reduces noise on the I^2C interface. When this pin is tied low, the input bandwidth on the I^2C interface is increased.
42–51	Cb/Cr9–0	I	10-Bit Progressive Scan/HDTV Input Port for Color Data. In 4:2:2 mode the multiplexed CrCb data must be input on these pins. Input port for B data when RGB is input.

9.10.4 ICs EPG Board

IC U1 : S3C3410X, EPG Board, Microcontroller

BLOCK DIAGRAM

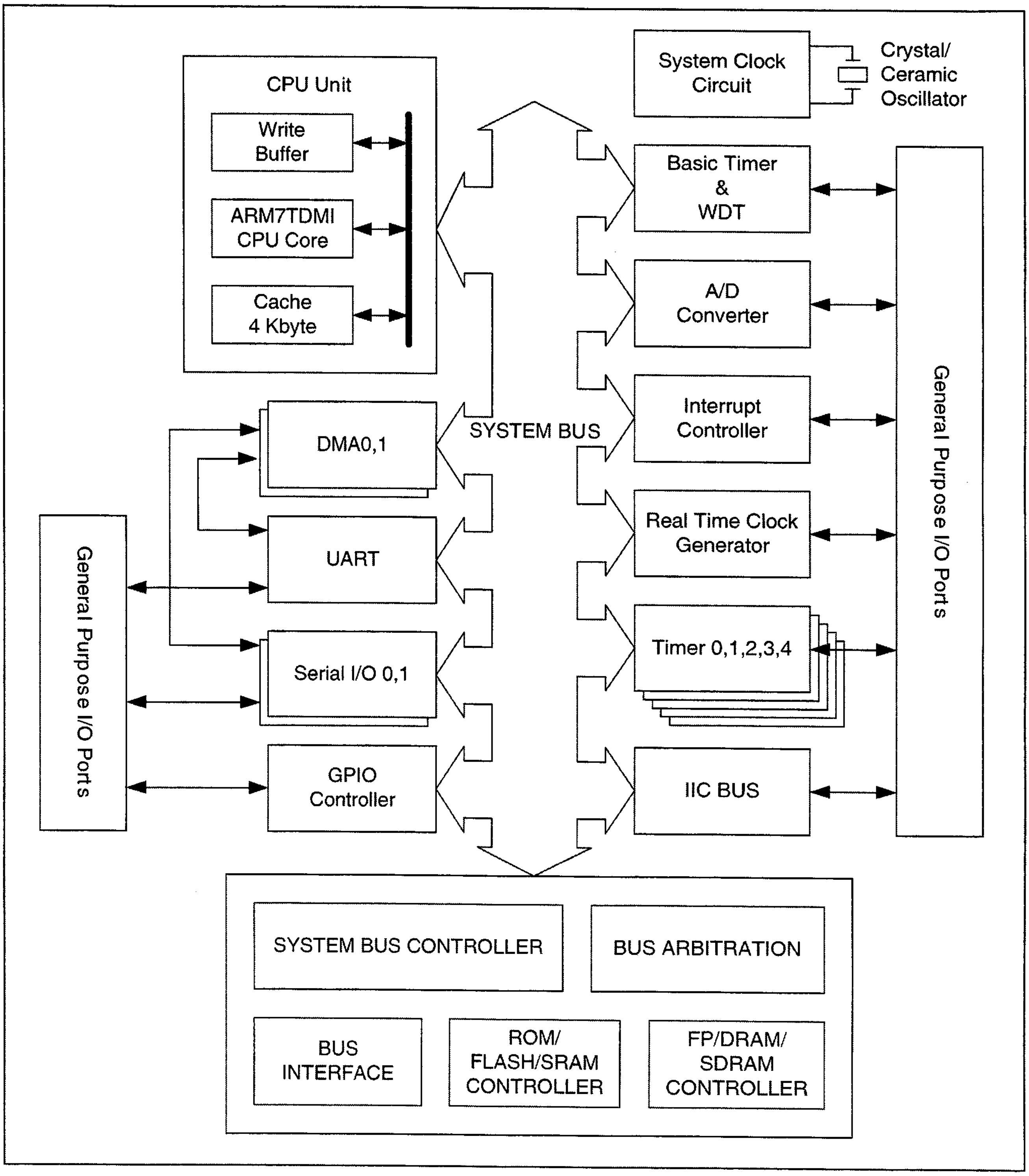

CPU Unit
Write Buffer
ARM7TDMI CPU Core
Cache 4 Kbyte
System Clock Circuit
Crystal/ Ceramic Oscillator
Basic Timer & WDT
A/D Converter
Interrupt Controller
Real Time Clock Generator
Timer 0,1,2,3,4
IIC BUS
General Purpose I/O Ports
SYSTEM BUS
DMA0,1
UART
Serial I/O 0,1
GPIO Controller
General Purpose I/O Ports
SYSTEM BUS CONTROLLER
BUS ARBITRATION
BUS INTERFACE
ROM/ FLASH/SRAM CONTROLLER
FP/DRAM/ SDRAM CONTROLLER

Figure 1-1. S3C3410X Block Diagram

10	VDDP		vdd	
11	TCLK3/P0.3	IO	pbseuct4	P0.3
12	TCLK4/P0.4	IO	pbseuct4	P0.4
13	TCAP3/TOUT3/PWM0/P0.5	IO	pbseuct4	P0.5
14	TCAP4/TOUT4/PWM1/P0.6	IO	pbseuct4	P0.6
15	EINT0/nWREXP/P0.7	IO	pbseuct8	P0.7
16	A0	O	pob8	A0
17	A1	O	pob8	A1
18	A2	O	pob8	A2
19	VSS	P	vss	
20	VDDP		vdd	
21	A3	O	pob8	A3

Table 1-1. 128-Pin QFP Pin Assignment (Continued)

Pin No	Function	I/O State @Initial	I/O Type	Reset
33	A13/A21O		pob8	A13
34	A14/A22O		pob8	A14
35	A15/A23O		pob8	A15
36	A16/P1.0	IO	pbcedct8	P1.0
37	A17/P1.1	IO	pbcedct8	P1.1
38	A18/P1.2	IO	pbcedct8	P1.2
39	A19/P1.3	IO	pbcedct8	P1.3
40	A20/EINT4/P1.4	IO	pbsedct8	P1.4
41	A21/EINT5/P1.5	IO	pbsedct8	P1.5
42	A22/EINT6/P1.6	IO	pbsedct8	P1.6
43	A23/EINT7/P1.7	IO	pbsedct8	P1.7
44	nCS0	O	pob8	nCS0
45	nCS1/P2.0I	O	pbceuct8	P2.0
46	nCS2/P2.1I	O	pbceuct8	P2.1
47	nCS3/P2.2I	O	pbceuct8	P2.2
48	nCS4/P2.3I	O	pbceuct8	P2.3
49	nCS5/P2.4I	O	pbceuct8	P2.4
50	nCS6:nRAS0:nSCS0/P2.5I	O	pbceuct8	P2.5
51	VSS	P	vss	
52	VDDP		vdd	
53	nCS7:nRAS1:nSCS1/P2.6I	O	pbceuct8	P2.6
54	EINT1/nECS0/P2.7	IO	pbseuct8	P2.7
55	nOEO		pob8	nOE
56	nASO		pob8	nAS
57	nWBE0:nBE0:DQM0/P3.0	IO	pbceuct8	P3.0
58	nWBE1:nBE1:DQM1/P3.1	IO	pbceuct8	P3.1
59	nCAS0:nSRAS/P3.2	IO	pbceuct8	P3.2
60	nCAS1:nSCAS/P3.3	IO	pbceuct8	P3.3
61	nWE/P3.4	IO	pbceuct8	P3.4
62	SCKE/P3.5	IO	pbceuct8	P3.5
63	SCLK/P3.6I	Op	bceuct8	P3.6
64	EINT2/nECS1/P3.7	IO	pbseuct8	P3.7

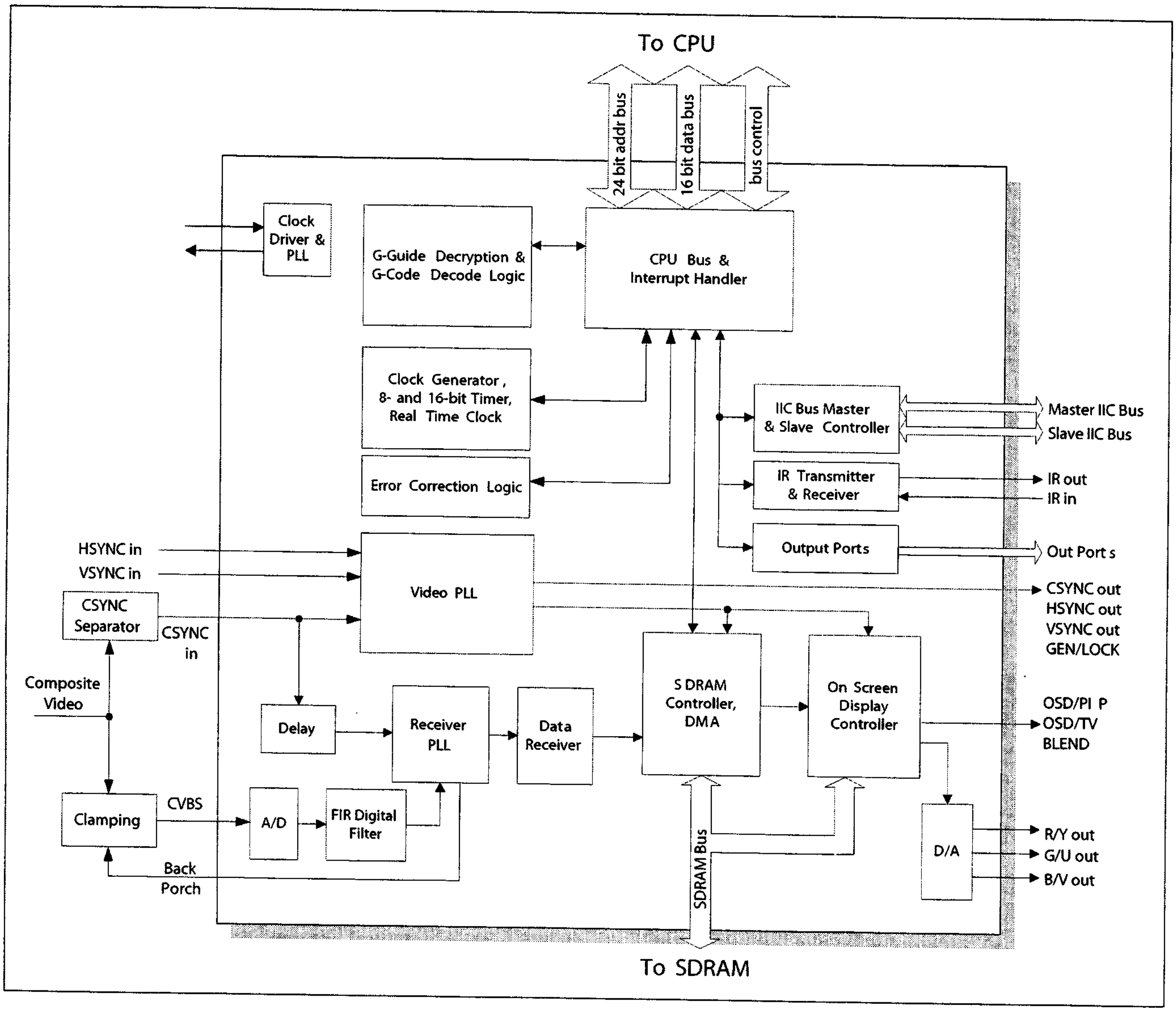
Table 1-1. 128-Pin QFP Pin Assignment (Continued)

Pin No	Function	I/O State @Initial	I/O Type	Reset
65	LP/P9.0O		pob8	LP
66	DCLK/P9.1O		pob8	DCLK
67	D0	IO	pbcedct8	D0
68	D1	IO	pbcedct8	D1
69	D2	IO	pbcedct8	D2
70	D3	IO	pbcedct8	D3
71	D4	IO	pbcedct8	D4
72	D5	IO	pbcedct8	D5
73	VSS	P	vss	
74	VDDP		vdd	
75	D6	IO	pbcedct8	D6
76	D7	IO	pbsedct8D	7
77	D8/A16/P4.0I	O	pbcedct8	P4.0
78	D9/A17/P4.1I	O	pbcedct8	P4.1
79	D10/A18/P4.2	IO	pbcedct8	P4.2
80	D11/A19/P4.3	IO	pbcedct8	P4.3
81	D12/A20/P4.4	IO	pbcedct8	P4.4
82	D13/A21/P4.5	IO	pbcedct8	P4.5
83	VSS	P	vss	
84	VDDP		vdd	
85	D14/A22/P4.6	IO	pbcedct8	P4.6
86	D15/A23/P4.7	IO	pbcedct8	P4.7
87	nDREQ0/P5.0I	O	pbceuct4	P5.0
88	nDACK0/P5.1	IO	pbceuct4	P5.1
89	nDREQ1/P5.2I	O	pbceuct4	P5.2
90	nDACK1/P5.3	IO	pbceuct4	P5.3
91	IICSDA/P5.4	IO	pbceuct8	P5.4
92	IICSCK/P5.5	IO	pbceuct8	P5.5
93	VSS	P	vss	
94	VDDP		vdd	
95	URXD/P5.6	IO	pbceuct4	P5.6
96	UTXD/P5.7I	O	pbceuct4	P5.7

Table 1-1. 128-Pin QFP Pin Assignment (Continued)

Pin No	Function	I/O State @Initial	I/O Type	Reset
97	SIORXD0/P6.0	IO	pbseuct4	P6.0
98	SIOCLK0/P6.1	IO	pbseuct4	P6.1
99	SIOTXD0/P6.2I	O	pbseuct4	P6.2
100	SIORDY/nWAIT/P6.3I	O	pbseuct4	P6.3
101	SIORXD1/P6.4	IO	pbseuct4	P6.4
102	SIOCLK1/P6.5	IO	pbseuct4	P6.5
103	SIOTXD1/P6.6	IO	pbseuct4	P6.6
104	EINT3/P6.7	IO	pbseuct4	P6.7
105	TCK/RP0/P7.0	IO	pbceuct4	P7.0
106T	MS/RP1/P7.1	IO	pbceuct4	P7.1
107T	DI/RP2/P7.2	IO	pbceuct4	P7.2
108	nTRST/RP3/P7.3	IO	pbceuct4	P7.3
109T	DO/RP4/P7.4	IO	pbceuct4	P7.4
110	RP5/P7.5	IO	pbceuct4	P7.5
111	VSS	P	vss	
112	VDDP		vdd	
113	RP6/P7.6	IO	pbceuct4	P7.6
114	RP7/P7.7	IO	pbceuct4	P7.7
115	XTAL0I		oscm	XTAL0
116	EXTAL0O		oscm	EXTAL0
117	RESET	I	pisu	RESET
118	TEST0I		pisT	EST0
119	TEST1I		pisT	EST1
120	RTCVDD	Pv	ddt	
121	XTAL1I		oscm	XTAL1
122	EXTAL1O		oscm	EXTAL1
123	ADCVSS	P	vsst	
124	AVREF	A	apad	AVREF
125	AIN0/P8.0	Ip	iseuc	P8.0
126	AIN1/P8.1	Ip	iseuc	P8.1
127	AIN2/P8.2	Ip	iseuc	P8.2
128	AIN3/P8.3	Ip	iseuc	P8.3

IC U2: GSA03, EPG Board, G-Guide System Controller


To CPU
24 bit addr bus
16 bit data bus
bus control
Clock Driver & PLL
G-Guide Decryption & G-Code Decode Logic
CPU Bus & Interrupt Handler
Clock Generator, 8- and 16-bit Timer, Real Time Clock
Error Correction Logic
IIC Bus Master & Slave Controller
Master IIC Bus
Slave IIC Bus
IR Transmitter & Receiver
IR out
IR in
Output Ports
Out Ports
HSYNC in
VSYNC in
Video PLL
CSYNC out
HSYNC out
VSYNC out
GEN/LOCK
CSYNC Separator
CSYNC in
Composite Video
Delay
Receiver PLL
Data Receiver
SDRAM Controller, DMA
On Screen Display Controller
OSD/PIP
OSD/TV
BLEND
Clamping
CVBS
A/D
FIR Digital Filter
Back Porch
SDRAM Bus
D/A
R/Y out
G/U out
B/V out
To SDRAM

Pin Functions

Pin Name	Pin Number	I/O	Function
SDRAM control			
MA [11..0]	115, 114, 143-149, 111-113	OA	ddress Bus to SDRAM
MD [15..0]	132-137, 139-140, 121, 123-129	I/O	Data Bus to SDRAM
MCLK	142	O	Clock to SDRAM
MCS	116	O	Chip Select to SDRAM
MRAS	117	O	Row Address Strobe to SDRAM
MCAS	118	O	Column Address Strobe to SDRAM
MWE	119	OW	rite Enable to SDRAM
MLDQM	120	OL	ower Data Input / Output Mask to SDRAM
MUDQM1	41	OU	pper Data Input / Output Mask to SDRAM
CPU interface			
RESCPU	58	OC	PU reset signal
SH/68K	62	IC	PU Bus mode selection
PCLK	199	O	Clock to CPU
LDS/WRL	197	I	68EC000 mode: Lower Data Strobe SH mode: Low Write strobe
UDS/WRH	198	I	68EC000 mode: Upper Data Strobe SH mode: High Write strobe
RW/RD	196	I	68EC000 mode: Read/Write strobe SH mode: Read strobe
DTACK/WAIT	201	O	68EC000 mode: Data Transfer Acknowledge SH mode: WAIT
IPL[2..0]	19-17	OI	nterrupt Privilege Level
IRQACK	57	I	68EC000 mode: interrupt acknowledge† SH mode: IRQOUT from CPU
PA23/CS	21	I	68EC000 mode: Address pin 23 SH mode: Chip Select input
PA[22..1]	22-25,28-30,39-50,54-56	IC	PU address bus (SH mode use UPA[21..1] only)
PD[15..0]1	6-12, 7-3, 207-202	I/O	CPU data bus
Flash/ROM control			
FOE5	90		Output Enable to Flash memory / ROM
FWE	60	OW	rite Enable to Flash memory
Video signal			
CSI	169	Ic	omposite sync input
HSI1	68	IH	sync input

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† Interrupt acknowledge is derived from the logical combination of the Function Code FC0, FC1, FC2 of 68EC000.

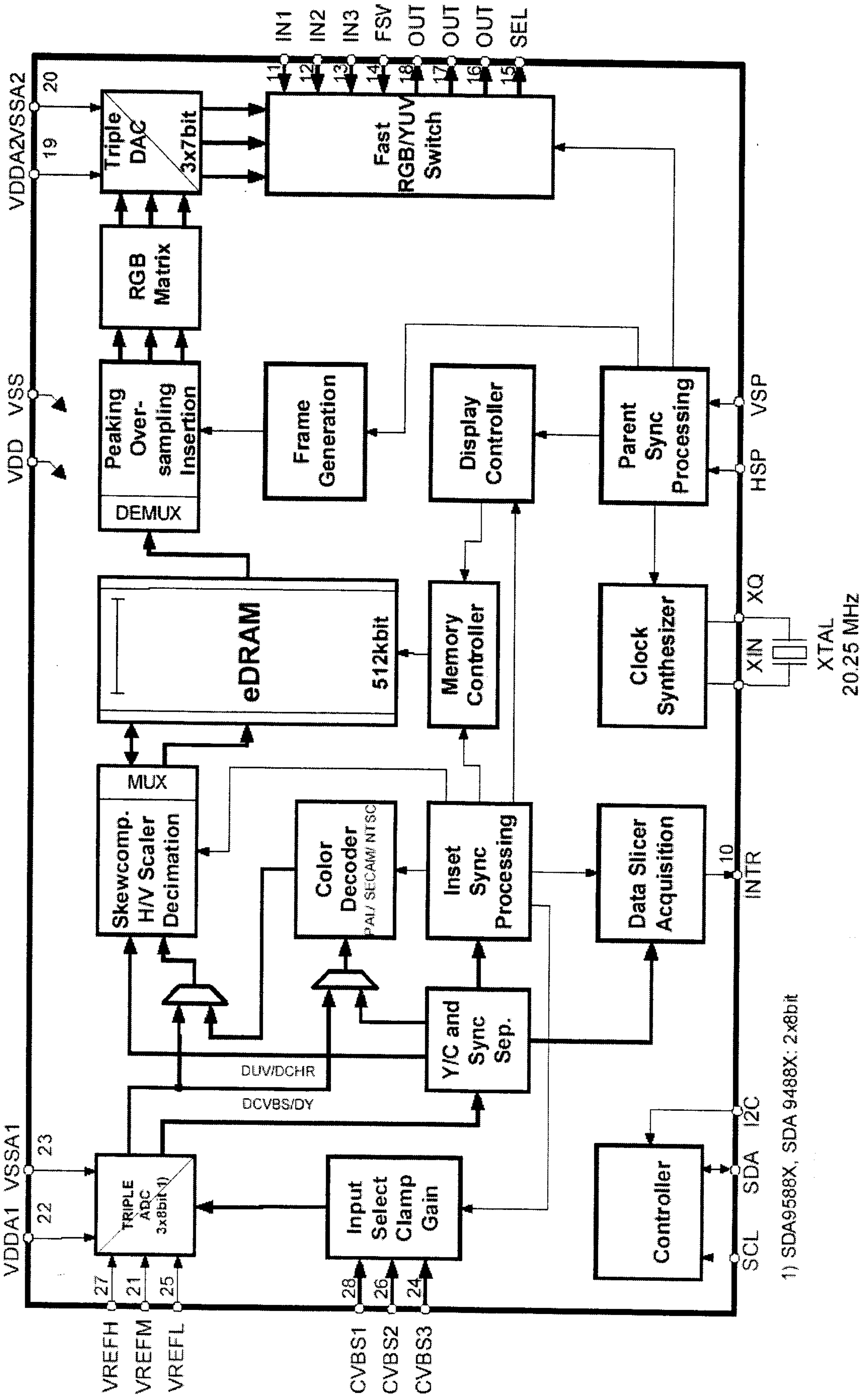
Pin Name	Pin Number	I/O	Function
VSI	167	IV	sync input
CSO	165	Oc	omposite sync output
HSO	164	OH	sync output
VSO	163	OV	sync output
BLEND9	3O		Alpha Blending Switch
OSD/TV	94	OO	SD / TV Switch
OSD/PIP9	5O		OSD / PIP Switch
BKP	162	OB	ack Porch signal for external clamping circuit
GEN/LOCK	161	OG	EN / LOCK PLL mode indicator
I^{2}C bus contro l			
MSCL6	6	I/O	Master IIC Bus Clock
MSDA6	7	I/O	Master IIC Bus Data
SSCL	160	I/O	Slave IIC Bus Clock
SSDA	159	I/O	Slave IIC Bus Data
Infra-Red interface			
IRIN	70	II	R code input
IROUT	158	OI	R code output
Miscellaneous			
OUTP0/HTST	68	O	Programmable output port 0 / H sync Test output
OUTP1/VBID6	9O		Programmable output port 1 / VBI Data test output
GCLR	61	IG	lobal Clear
Oscillation			
XTAL19		I	Connect to an 36MHze xternal resonator. When in external clock input mode, an external clock is input via this pin.
XTAL21	0O		Connect to an 36MHze xternal resonator. When in external clock input mode, this pin is left open
Analog Signals			
R/YOUT	85	O	Red or Y Output
G/UOUT8	7O		Green or U Output
B/VOUT	89	OB	lue or V Output
CVBS	189	I	Composite Video Base-band Signal

Pin Name	Pin Number	Function
Powe r		
DVDD	31, 171	3.3V power supply for digital portion of internal hybridcircuit
DGND	37, 195	0V ground reference for digital portion of internal hybrid circuit
AVDD	33, 81, 83, 172, 174	3.3V power supply for analogportion of internal hybrid circuit
AGND	35, 90, 91, 193, 194	0V ground reference for analog portion of internal hybrid circuit

Pin Name	Pin Number	Function
VDD	11, 27, 53, 78, 104, 130, 157, 166, 208	3.3V power supply for the digital logic circuit
GND	1, 2, 8, 20, 26, 51, 52, 63-65, 71, 72, 79, 96, 97, 102, 103, 105-110, 122, 131, 138, 150, 151, 155, 156, 170, 200	0V ground reference for the digital logic circuit
Miscellaneou s		
VRTS, VRT, VRB, VRBS, VCLMP	176, 178, 182, 183, 185	Reference voltage inputs for internal A/D converter(See Chapter 6)
NC	32, 34, 36, 38, 73-77, 80, 82, 84, 86, 88, 92, 98-.101, 152-154, 173, 175, 177, 179-181, 184, 186-188, 190-192	Not connected

IC U11: SDA9488X, EPG Board, Picture in Picture IC

Block Diagram


VDDA2/VSSA2
20
19
Triple DAC 3x7bit
Fast RGB/YUV Switch
IN1
IN2
IN3
FSV
OUT
OUT
OUT
SEL
11
12
13
14
18
17
16
15
RGB Matrix
VDD
VSS
Peaking Over-sampling Insertion
DEMUX
Frame Generation
Display Controller
Parent Sync Processing
VSP
HSP
eDRAM
512kbit
Memory Controller
Clock Synthesizer
XQ
XIN
XTAL 20.25 MHz
MUX
Skewcomp. H/V Scaler Decimation
Color Decoder PAL/ SECAM/ NTSC
Inset Sync Processing
Data Slicer Acquisition
10
INTR
Y/C and Sync Sep.
DUV/DCHR
DCVBS/DY
VDDA1
VSSA1
23
22
TRIPLE ADC 3x8bit 1)
Input Select Clamp Gain
Controller
I2C
SDA
SCL
27
21
25
28
26
24
VREFH
VREFM
VREFL
CVBS1
CVBS2
CVBS3

1) SDA9588X, SDA 9488X: 2x8bit

Numb er	Name	Type	Description
1	XIN	I	crystal oscillator (input) or external clock input
2	XQ	O	crystal oscillator (output)
3	HSP	I/TTL	horizontal sync for parent channel
4	VSP	I/TTL	vertical sync for parent channel
5	SDA	I/O	I^2C-bus data
6	SCL	I	I^2C-bus clock
7	VDD	S	digital supply voltage
8	VSS	S	digital ground
9	I2C	I	I^2C Address
10	INT	O/TTL	interrupt
11	IN1	I/ana	V/R input for external YUV/RGB source
12	IN2	I/ana	Y/G input for external YUV/RGB source
13	IN3	I/ana	U/B input for external YUV/RGB source
14	FSW	I	fast switch input for YUV/RGB switch
15	SEL	O	fast blanking output for PIP
16	OUT3	O/ana	analog output: chrominance signal +(B-Y) or -(B-Y) or B
17	OUT2	O/ana	analog output: luminance signal Y or G
18	OUT1	O/ana	analog output: chrominance signal +(R-Y) or -(R-Y) or R
19	VDDA2	S	analog supply voltage for DAC
20	VSSA2	S	analog ground for DAC
21	VREFH	I/ana	uppper reference voltage for ADC and DAC
22	VDDA1	S	analog supply voltage for ADC
23	VSSA1	S	analog ground for ADC
24	CVBS3	I/ana	CVBS3 or V (SDA 9588X) or C Input
25	VREFL	I/O	lower reference voltage for ADC
26	CVBS2	I/ana	CVBS2 or U (SDA 9588X) or Y (of Y/C) Input
27	VREFM	I/O	mid-level reference voltage for ADC
28	CVBS1	I/ana	CVBS1 or Y (of YUV, SDA 9588X) Input

I= Input / ana=analog / O= Output / TTL=Digital (TTL) / S=Supply voltage

9.11 List of Abbreviations

Analog Board

+5VSTBY	Permanent Supply 5V
8SC2	Pin8 Scart2 (only for Europe)
A_DATA	Data from Analog- to Digital-Board (UART-Communication)
A_RDY	Analog-board ready (status information to digital-board)
A18 - A19	Parallel Address Bus (CC - Flash-ROM and S-RAM)
A8 - A17	Parallel Address Bus (CC - Flash-ROM and S-RAM)
AD0 - AD7	Parallel Address Bus (CC - Flash-ROM and S-RAM)
AFC	Automatic Frequency Control
AFEL	Audio Frontend Left
AFER	Audio Frontend Right
AGC / WSRI	Automatic Gain Control (for Europe), Wide Screen Rear In (for NTSC)
AINFL	Audio In Front Left
AINFR	Audio In Front Right
AKILL	Audio Kill Signal
ALADC	Audio Left to ADC
ALDAC	Audio Left from DAC
ALE	Address Latch Enable
AM0	Adress-mode 0
AM1	Adress-mode 1
ARADC	Audio Right to ADC
ARDAC	Audio Right from DAC
ASCC1	Audio Scart 1 Mute (System Clock Output for Real time Clock-Adjustment)
AVCC	Power Supply for A/D-converter
AVSS	GND-Pin for A/D-converter
CFIN	Chroma Front In
CS0_	Chip Select 0 (CC - S-RAM)
CS2_	Chip Select 2 (CC - Flash-ROM)
CVBSFIN	Video Front In
D_DATA	Data from Digital- to Analog-Board (UART-Communication)
D_RDY	Digital-board ready (status information from digital-board)
DAC_MUTE	Mute Signal for DAC
DAOUT	Digital Audio Out
DVAL	Audio from Digital Video In Left
DVAR	Audio from Digital Video In Right
DVCC1	Power Supply Pin
DVCC2	Power Supply Pin
DVCC3	Power Supply Pin
DVSS1	GND Pin
DVSS2	GND Pin
DVSS3	GND Pin
FAN_OFF	Fan for Basic engine
FBIN	Fast Blanking input
FOME	FOllow ME Status line (matching signals yes/no; only for Europe)
G1...10	DISPLAY GRID
INT	Interrupt OUT for the CC
INT	Interrupt – line from Display Print
ION	Inverse ON-Line
IPFAIL	Inverse Power Fail Detection
IPOR	Inverse Power On Reset
IRESET	Inverse Reset Input
K1	Key-Input-Line
K2	Key-Input-Line
KILL	Signal from IR-Receiver
P50 IN	P50 INput-line (only for Europe)
P50 OUT	P50 OUTput-line (only for Europe)
POR_DC	Power On Reset for Display Control Print (Ext_DL)
PSS	Output Enable ReaD (CC - Flash-ROM and S-RAM)
PWM_FIL	Control line for Filament Voltage Generation
PWONSW	Amplifier Switch Audio A/D Converter
RD_	Pal/Secam-Select
RECLED	Control Signal for REC-LED
RESET_DIG	Reset Line to Digital Board
RP_	Inverse Reset line to Flash-ROM
RSA1/2	Record Selector 1/2
RY/BY_	Ready/Busy – input line (from Flash-ROM)
SIF1	Sound intermediate frequency
SB1	Secam Band 1 (PCB-Test entrance)
SCL	IC-Bus
SCLSW	Switched I^2C-Bus
SDA	IC-Bus
SDASW	Switched I^2C-Bus
SFS_TS	SAW Filter Select Trap Select
STBY	Standby-Line (Flash_Toshiba)
SYNC	Video Sync input
TEMP_SENSE	Temperature Sense Line
VER	HW-version input
VFV	Video from Frontend
VKK	VFT Driver Power Supply
VREFH	Pin for Reference-voltage input to A/D-converter
VREFL	Pin for Reference-voltage input to A/D-converter
VS1/2	View Selector 1/2
WR_	Write Enable (CC - Flash-ROM and S-RAM)
WSFI	Wide Screen Signalling Front In
WU	Wake Up
X1	Oscillator Pin
X12	Oscillator Pin
XIN	Oscillator Pin
XOUT	Oscillator Pin
XT1	Low Frequency Oscillator Pin
XT2	Low Frequency Oscillator Pin
YFIN	Luminance Front In

Digital Board

+12V	+12V Power Supply
+2V5_FLI	+2V5 Power Supply for FLI
+2V5_PLL	+2V5 Power Supply for PLL
+3V3	+3V3 Power Supply
+3V3_ANA	+3V3 Power Supply Analogue
+3V3_DD	+3V3 Power Supply Digital
+3V3_FLI	+3V3 Power Supply for FLI
+5V	+5V Power Supply
+5V_BUFFER	+5V Power Supply for Video Filters
5508_HS	Horizontal Synchronisation from Host Decoder to Progressive Scan
5508_ODD_EVEN	Odd - Even control from Host Decoder to Progressive Scan
-5V	-5V Power Supply
-5V_BUFFER	-5V Power Supply for Video Filters
A_EMPRESS(13:0)	EMPRESS address output to SDRAM
ACC_ACLK_OSC	Audio Clock PLL output sync with incoming video for record
ACC_ACLK_PLL	Audio Clock PLL output for play back
ACLK_EMP	EMPRESS audio clock output
AD_ACLK	Audio Decoder Clock
AD_BCLK	Audio Decoder I2S bit clock
AD_DATAO	Audio Decoder Output data (PCM)
AD_SPDIF33	Audio digital output to the analog board
AD_WCLK	Audio Decoder I2S word clock
AE_ACLK	Audio Encoder Clock
AE_ACLK_OEN	Audio Encoder Clock Output Enable
AE_BCLK	Audio Encoder I2S bit clock
AE_BCLK_DV	Audio Encoder I2S bit clock to DVIO
AE_BCLK_VSM	Audio Encoder I2S bit clock to VSM
AE_DATAI	Audio Encoder Input data (PCM

AE_DATAI_DV	Audio Encoder Input data (PCM) from DVIO
AE_DATAO	Audio Encoder Output data (PCM)
AE_WCLK	Audio Encoder I2S word clock
AE_WCLK_DV	Audio Encoder I2S word clock to DVIO
AE_WCLK_VSM	Audio Encoder I2S word clock to VSM
ANA_WE	Analogue write enable
ANA_WE_LV	Analogue write enable Low Voltage
B_IN_VIP	Video blue input to Video Input Processor
B_OUT	Video blue output from Host Decoder
B_OUT_B	Filtered blue video output
BA	Bank Address
BCLK_CTL_SERVICE	Bitclock control Service Interface
BE_BCLK	Basic Engine I2S bit clock
BE_BCLK_VSM	Basic Engine I2S bit clock to VSM
BE_CPR	Basic Engine Control Processor ready to accept data
BE_DATA_RD	Basic Engine Data read
BE_DATA_WR	Basic Engine Data write
BE_FAN	Basic Engine FAN
BE_FLAG	Basic Engine error flag
BE_IRQN	Basic Engine interrupt request
BE_LOADN	Basic Engine LOAD(LOW active)
BE_RXD	Basic Engine S2B received data
BE_SUR	Basic Engine servo unit ready to accept data (S2B)
BE_SYNC	Basic Engine sector/abs time sync
BE_TXD	Basic Engine S2B transmitted data
BE_V4	Basic Engine versatile input pin
BE_WCLK	Basic Engine I2S word clock
C_IN	Video Chrominance input
C_IN_VIP	Chrominance input to Video Input Processor
C_OUT	Chrominance output from Host Decoder
C_OUT_B	Filtered Chrominance output
CAS	Column Address strobe
CB_OUT(9:0)	Chrominance Blue out
CLK4	SDRAM clock
CPUINT0	Control processor unit interrupt
CPUINT1	Control processor unit interrupt
CR_OUT(9:0)	Chrominance Red out
CTS1P	Clear to send (Service Interface)
CVBS_OUT	Composite video output out of the Host Decoder
CVBS_OUT_B	Filtered Composite video output
CVBS_OUT_B_VIP	Composite video output to Video Input Processor(digital board video loop)
CVBS_Y_IN	Composite video/Luminance input
CVBS_Y_IN_A	Composite video/Luminance input to Video Input Processor
CVBS_Y_IN_B	Composite video/Luminance input to Video Input Processor
CVBS_Y_IN_C	Composite video/Luminance input to Video Input Processor
D_ADDR(10:0)	Address bus
D_DATA(29:0)	Data bus
D_EMPRESS(15:0)	SDRAM data input/output of EMPRESS
D_PAR_D(7:0)	Front-end parallel interface data (record)
D_PAR_DVALID	Front-end parallel interface data valid
D_PAR_REQ	Front-end parallel interface request
D_PAR_STR	Front-end parallel interface strobe
D_PAR_SYNC	Front-end parallel interface sync
DV_IN_CLK	Digital Video in clock from DVIO board
DV_IN_CLK	Digital Video in data bus from DVIO board
DV_IN_HS	Digital Video in horizontal synchronisation from DVIO board
DV_IN_VS	Digital Video in vertical synchronisation from DVIO board

EMI_A(21:1)	External Memory Interface Address Bus(Host Decoder)
EMI_BE0N	External Memory Interface Lower byte enable(Host Decoder)
EMI_BE1N	External Memory Interface Upper byte enable(Host Decoder)
EMI_CAS0N	External Memory Interface SDRAM column address strobe(Host Decoder)
EMI_CE1N	External Memory Interface VSM Lower bank enable
EMI_CE2N	External Memory Interface VSM Higher bank enable
EMI_CE3N	External Memory Interface flash IC's enable
EMI_D(15:0)	External Memory Interface Data Bus(Host Decoder)
EMI_PROCCLK	External Memory Interface Processor Clock(Host Decoder)
EMI_RWN	External Memory Interface Read/Write control signal(Host Decoder)
EMI_WAIT	External Memory Interface Wait state request(Host Decoder)
EMPRESS_BOOT	EMPRESS BOOT select input
EMPRESS_IRQN	EMPRESS Interrupt request output
FLASH_OEN	FLASH output enable control signal
G_IN_VIP	Video green input to Video Input Processor
G_OUT	Video green output from Host Decoder
G_OUT_B	Filtered green video output from Host Decoder
GNDD	Digital Ground
HD_M_AD(13:0)	Host Decoder SDRAM address bus
HD_M_CASN	Host Decoder SDRAM column address strobe
HD_M_CLK	Host Decoder SDRAM clock
HD_M_CS0N	Host Decoder SDRAM chip select
HD_M_DQ(15:0)	Host Decoder SDRAM data bus
HD_M_DQML	Host Decoder SDRAM data mask enable(Lower)
HD_M_DQMU	Host Decoder SDRAM data mask enable(Upper)
HD_M_RASN	Host Decoder SDRAM row address strobe
HD_M_WEN	Host Decoder SDRAM write enable
HSOUT	Horizontal synchronisation OUT
ION	Inverted ON: Enable the power supply for the digital board when LOW
IRESET_DIG	Initialisation of the digital board, HIGH when power ON
JTAG3_TCK	JTAG Test Clock
JTAG3_TD_VIP_TO_VEJTAG	Transmitted Data Video Input Processor to Video Encoder
JTAG3_TD_VSM_TO_VIPJTAG	Transmitted Data Versatile Stream Manager to Video Input Processor
JTAG3_TMS	JTAG Test Mode Select
JTAG3_TRSTN	JTAG Test part ResetN
LOAD_DVN	LOAD Digital Video(LOW active)
MUTEN	Mute enable
MUTEN_LV	Mute enable Low Voltage
P_SCAN_YUV(7:0)	Progressive Scan digital video bus
R_IN_VIP	Video Red input to Video Input Processor
R_OUT	Video Red output from Host Decoder
R_OUT_B	Filtered Red Video output from Host Decoder
RAS	Row Address Strobe
RESETN	Reset Host Decoder
RESETN_BE	System reset basic engine (buffered)
RESETN_DVIO	System reset Digital Video Input Output (buffered)
RESETN_VE	System reset Video Encoder
ROMH_CEN	Flash 2 chip enable

ROML_CEN	Flash 1 chip enable
RSTN_BE	Reset control of basic engine
RSTN_DVIO	Reset control of DVIO
RTS1P	Ready To Send data to service serial interface
RX1P	Receive data from service serial interface
SCL	I2C bus clock
SD_CASN	SDRAMColumn Address strobe output (active LOW)
SD_CLK	SDRAMclock output
SD_CLKE	SDRAMclock enable output
SD_CSN	SDRAM
SD_DQM(1:0)	SDRAMdata mask enable output
SD_RASN	SDRAMrow address strobe output
SD_WEN	SDRAMwrite enable output
SDA	I2C bus dataSEL_ACLK1Select audio clock(playback)
SM_CS3N	SRAMchip select
SM_LBN	SRAMlower bank
SM_OEN	SRAMoutput enable
SM_UBN	SRAMupper bank
SM_WEN	SRAMoutput enable
SMA(17:0)	SRAMaddress output
SMD(15:0)SRAM	data input/output
SYSCLK_EMPRESS	System clock EMPRESS
SYSCLK_PROGSCAN	System clock Progressive Scan
SYSCLK_VSM_5508	System clock VSM and Host decoder
TX1P	Transmit data to service serial interface
U_IN	Video U input
U_IN_VIP	Video U input to Video Input Processor
V_IN	Video V input
V_IN_VIP	Video V input to Video Input Processor
VCC3_CLK_BUF	Power supply 3V3 clock buffer
VCC3_VSM	Power supply 3V3 Versatile Stream Manager
VCC3_VSM_MEM	Power supply 3V3 Versatile Stream Manager Memory
VCC5_4046	Power supply 5V to PLL IC
VDD_125	Power supply 5V to buffer 7202
VDD_CORE	Sti5508 Core supply voltage 2.5V
VDD_EMP	Empress supply voltage 3.3V
VDD_EMP_CORE	Empress Core supply voltage 2.5V
VDD_FLASH_H	Flash 7301 supply voltage
VDD_FLASH_L	Flash 7302 supply voltage
VDD_LVC32	Power supply LVC32
VDD_PCM	Power supply Audio decoder of Sti5508
VDD_PLL	Power supply PLL audio decoder of Sti5508
VDD_RGB	Power supply video encoder of Sti5508
VDD_STI	Power supply of Sti5508
VDD_YCC	Power supply video encoder of Sti5508
VDD5_MK2703	Power supply MK2703
VDD5_OSC	Power supply Oscillator
VDDA1A_7118	Power supply for analog input of VIP
VDDA2A_7118	Power supply for analog input of VIP
VDDA3A_7118	Power supply for analog input of VIP
VDDA4A_7118	Power supply for analog input of VIP
VDDE_7118	Power supply digital for peripheral cells of VIP
VDDI_7118	Power supply digital for core of VIP
VDDX_7118	Power supply for crystal oscillator of VIP
VE_DATA(7:0)	Video Encoder data Bus
VE_DSN	Video Encoder Data Strobe
VE_DTACKN	Video Encoder Data Transfer acknowledge
VIP_ERROR	Video Input Processor error
VIP_FB	Video Input Processor Fast Blanking
VIP_FID_FF	Video Input Processor field indentifier to Flip Flop
VIP_HS	Video Input Processor horizontal
VIP_ICLK	Video Input Processor input Clock
VIP_IDQ	Video Input Processor output data qualifier
VIP_IGP1	Video Input Processor input general purpose 1
VIP_INT	Video Input Processor interrupt
VIP_RTS1	Video Input Processor ready to send
VIP_VS	Video Input Processor vertical
VIP_YUV(7:0)	Video Input Processor digital video(CCIR 656)
VS_IN	Vertical synchronisation IN
VSM_M_A(13:0)	Versatile Stream Manager SDRAM address bus
VSM_M_CASN	Versatile Stream Manager SDRAM column address strobe
VSM_M_CLKEN	Versatile Stream Manager SDRAM clock enable
VSM_M_CLKOUT	Versatile Stream Manager SDRAM clock out
VSM_M_D(15:0)	Versatile Stream Manager SDRAM data bus
VSM_M_LDQM	Versatile Stream Manager SDRAM lower data mask enable
VSM_M_RASN	Versatile Stream Manager SDRAM row address strobe
VSM_M_UDQM	Versatile Stream Manager SDRAM upper data mask enable
VSM_M_WEN	Versatile Stream Manager SDRAM write enable
VSM_UART1_CTSN	Versatile Stream Manager UART1 clear to send to analog board (UART1
VSM_UART1_RTSN	Versatile Stream Manager UART2 clear to send to DVIO board (UART2 is gateway to DIVIO board)
VSM_UART1_RX	Versatile Stream Manager UART1 ready to send to analog board
VSM_UART1_TX	Versatile Stream Manager UART2 ready to send to DVIO board
VSM_UART2_CTSN	Versatile Stream Manager UART1 received data to analog board
VSM_UART2_RTSN	Versatile Stream Manager UART2 received data to DVIO board
VSM_UART2_RX	Versatile Stream Manager UART1 transmitted data to analog board
VSM_UART2_TX	VersatileStream Manager UART2 transmitted data to DVIO board
VSOUT	Vertical synchronisation OUT
WE	Write Enable
Y_IN	Luminance input from analog board
Y_OUT	Luminance output from Host Decoder
Y_OUT_B	Filtered luminance output
YY_OUT(9:0)	Luminance output from FLI

Digital Board Chrysalis

ADC	Analog to Digital Converter
DAC	Digital to Analog Converter
DENC	Digital (Video) Encoder (Video DAC)
DV	Digital Video (Camcorder)
EF	Emitter Follower
OSD	On-Screen Display
VIP	Video Input Processor (Video ADC)
2Fh	Progressive scan video
2V5	+2V5 Power supply for Link+Codec IC7431
3V3	+3V3 Power supply
3V3_A	+3V3 Analog power supply for PHY IC7400
3V3_D	+3V3 Digital power supply for PHY IC7400
3V3_DLY	+3V3 Power supply for IC7500

3V3_LINK	+3V3 Power supply for Link+Codec IC7431
3V3_F	+3V3 Power supply for optional Flash memory IC7432
3V3_RAM	+3V3 Power supply for SDRAM IC7430
3V3_uP	+3V3 Power supply for Micro-controller IC7802
3V3_32kHz	+3V3 Power supply for audio format adaptation circuitry IC7507 and IC7508
3V3_AC	+3V3 Power supply for audio system clock generator IC7605 and IC7606
+5V	+5V Power supply
5V_PLL	+5V Power supply for VCO of audio PLL IC7604
A (1:17)	Flash address lines of uPD72893
A_MUTE	Audio Mute
ABCK	Audio Bit Clock
AD (1:10)	Address bus lines for Host I/F of Link+Codec IC7431
AEMP1	PCM1 emphasis ON/OFF for PCM1 output
AFS1	Audio sampling frequency indication signal
ALRCLK	Audio Word Select
AMCLK44	11.2896MHz (=256 * 44.1 kHz) audio master clock signal for 44.1 kHz audio
AMCLK48	12.288MHz (=256 * 48 kHz) audio master clock signal for 32 kHz and 48 kHz audio
APWM	PWM signal for audio PLL
ASIC	Application Specific Integrated Circuit
BUFENn_AUD	Buffer Enable Audio
BUFENn_VID	Buffer Enable Video
CLK27M_CON	27MHz Clock to Digital Board
CS	Parallel interface chip select input of Link+Codec IC7431
CTL (0:1)	Link interface control lines
CTSN	Clear to Send
D (0:15)	Flash data lines of Link+Codec IC7431
DCDi	Directional Correlational Deinterlacing. Circuitry that reduces jaggies on diagonal edges when deinterlacing video-sourced material.
DV_STATUS	Interrupt pin for reading DV-status
HS_CLK	Video clock input of Link+Codec IC7431
INT	Interrupt request output of Link+Codec IC7431 (input to Micro-Controller)
IOR	Parallel interface IO read control input of Link+Codec IC7431
ISPN	In System Programming signal (used for programming IC7802)
LKON	Link-on signal outputLPSLink power status inputLREQLink request input
MA (0:10)	SDRAM address lines of Link+Codec IC7431
MCAS	SDRAM column address strobe signal
MCLK	SDRAM clock signal
MD (0:15)	SDRAM data lines of Link+Codec IC7431
MRAS	SDRAM row-address strobe signal
MWE	SDRAM write enable signal
PCM1	Audio Serial Data Output of Link+Codec IC7431
PCM1_NEW	'MSB justified' to I2S converted audio serial data; audio serial data input of audio DAC UDA1334A
PD (0:15)	Data bus lines for Host I/F of Link+Codec IC7431
PHY_D (0:7)	Data bus connection between PHY and LINK device
RESETn	DVIO board reset
RESET_FM	Reset signal driven by Flashmaster programming device
RESTB	Reset input of Link+Codec IC7431
RTSN	Request to Send
RWZ	Parallel interface read/write control input of Link+Codec IC7431
RXD	Receive Data
SCLK	Link control output clock
TXD	Transmit Data
VPP	+10V switchable programming voltage of microcontroller
YUV (0:7)	Digital Video

DVIO 1.8 Board

2V5	+2V5 Power supply for Link+Codec IC7431
3V3	+3V3 Power supply
3V3_A	+3V3 Analog power supply for PHY IC7400
3V3_D	+3V3 Digital power supply for PHY IC7400
3V3_DLY	+3V3 Power supply for IC7500
3V3_LINK	+3V3 Power supply for Link+Codec IC7431
3V3_F	3V3 Power supply for optional Flash memory IC7432
3V3_RAM	+3V3 Power supply for SDRAM IC7430
3V3_uP	+3V3 Power supply for Microcontroller IC7802
3V3_32kHz	+3V3 Power supply for audio format adaptation circuitry IC7507 & IC7508
3V3_AC	+3V3 Power supply for audio system clock generator IC7605 & IC7606
+5V	+5V Power supply
5V_PLL	5V Power supply for VCO of audio PLL IC7604
A(1:17)	Flash adress lines of uPD72893
A_MUTE	Audio Mute
ABCK	Audio Bit Clock
AD(1:10)	Address bus lines for Host I/F of Link+Codec IC7431
AEMP1	PCM1 emphasis ON/OFF for PCM1 output
AFS1	Audio sampling frequency indication signal
ALRCLK	
AMCLK44	11,2896MHz (=256*44.1kHz) audio master clock signal for 44.1kHz audio
AMCLK48	12,288MHz (=256*48kHz) audio master clock signal for 32kHz and48kHz audio
APWM	PWM signal for audio
PLLBUFENn_AUD	Buffer Enable
AudioBUFENn_VID	Buffer Enable
VideoCLK27M_CON	27MHz Clock to Digital Board
CS	Parallel interface chip select input of Link+Codec IC7431
CTL(0:1)	Link interface control lines
CTSN	Clear to Send
D(0:15)	Flash data lines of Link+Codec IC7431
DV_STATUS	Interupt pin for reading DV-status
HS_CLK	Video clock input of Link+Codec IC7431
INT	Interrupt request output of Link+Codec IC7431 (input to Micro-Controller)
IOR	Parallel interface IO read control input of Link+Codec IC7431

10. Spare Parts List

10.1 Exploded View of the Set

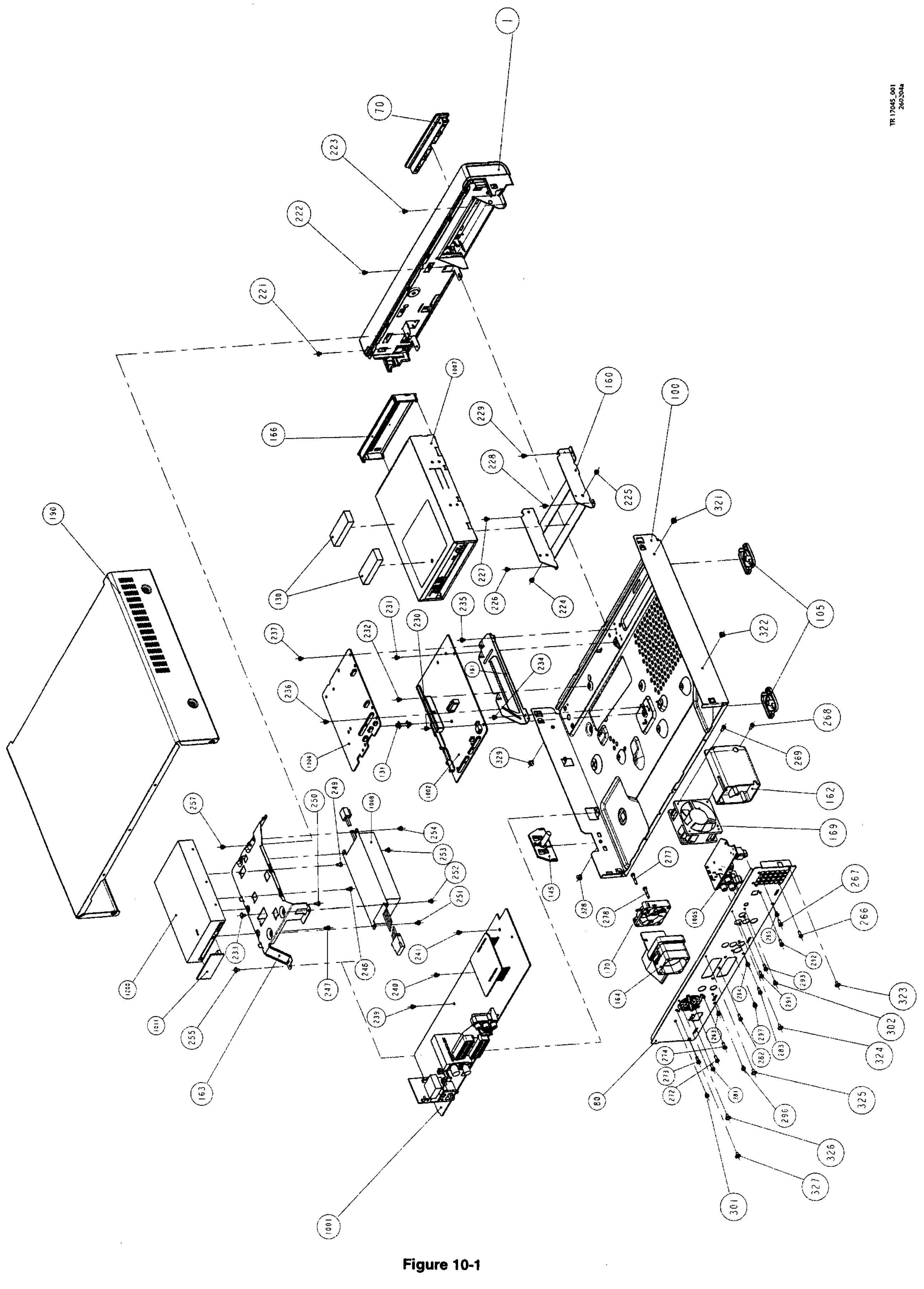

190
1200
1011
255
163
257
233
250
247
249
248
1008
239
240
241
251
252
253
254
1001
1306
236
237
130
166
221
222
223
70
1
131
232
231
230
1002
235
161
1007
227
226
228
229
224
225
160
234
329
145
328
80
164
170
278
277
100
321
1005
169
162
269
268
322
105
272
273
274
301
281
263
296
284
282
237
283
291
265
293
292
266
267
327
326
325
324
302
323
TR 17045_001
260204a

Figure 10-1

10.2 Exploded View of the Front Panel Complete

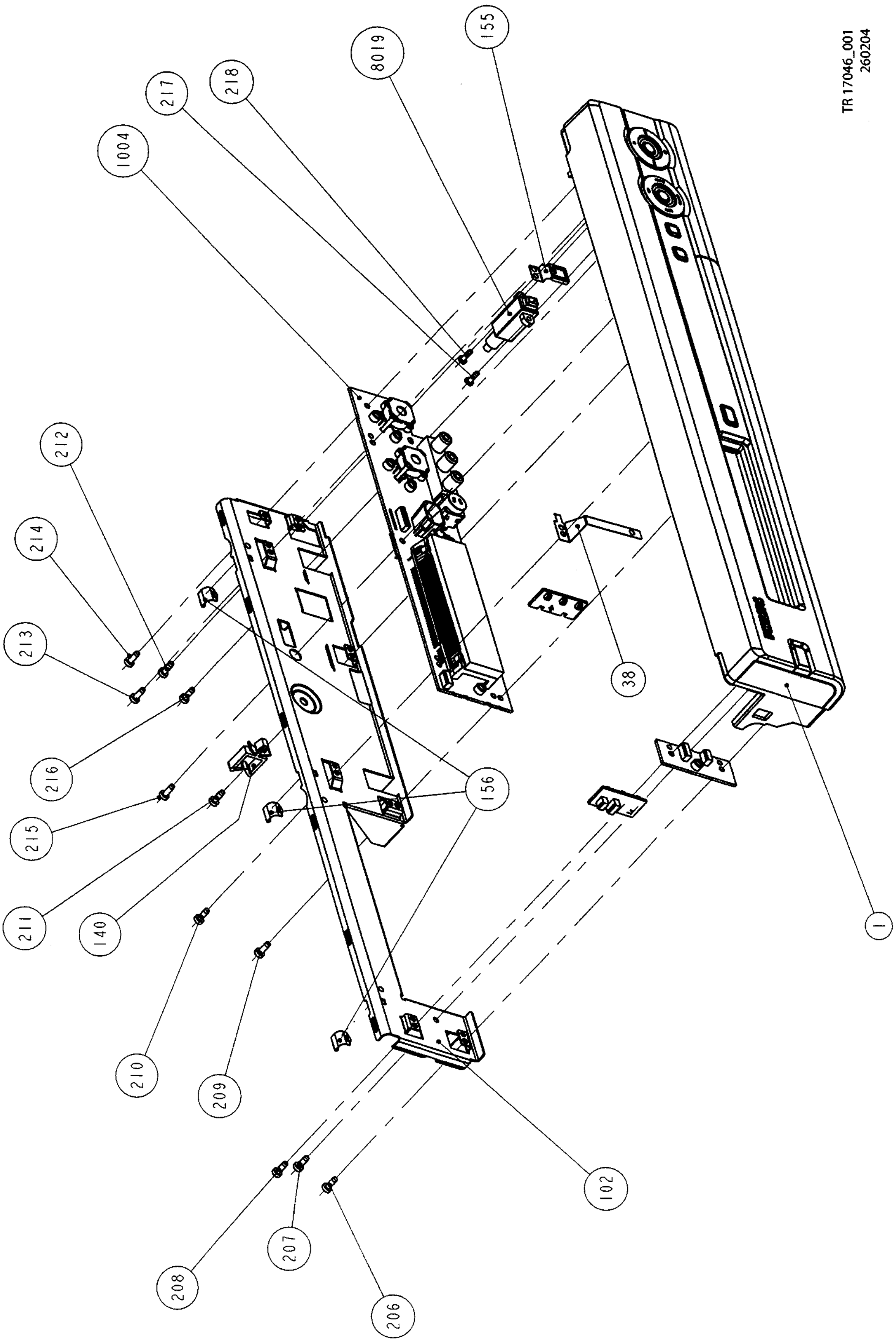

155
8019
218
217
1004
212
214
213
216
215
211
140
210
209
156
38
1
102
207
208
206
TR 17046_001
260204

Figure 10-2

10.3 Exploded View of the Front without PWBs

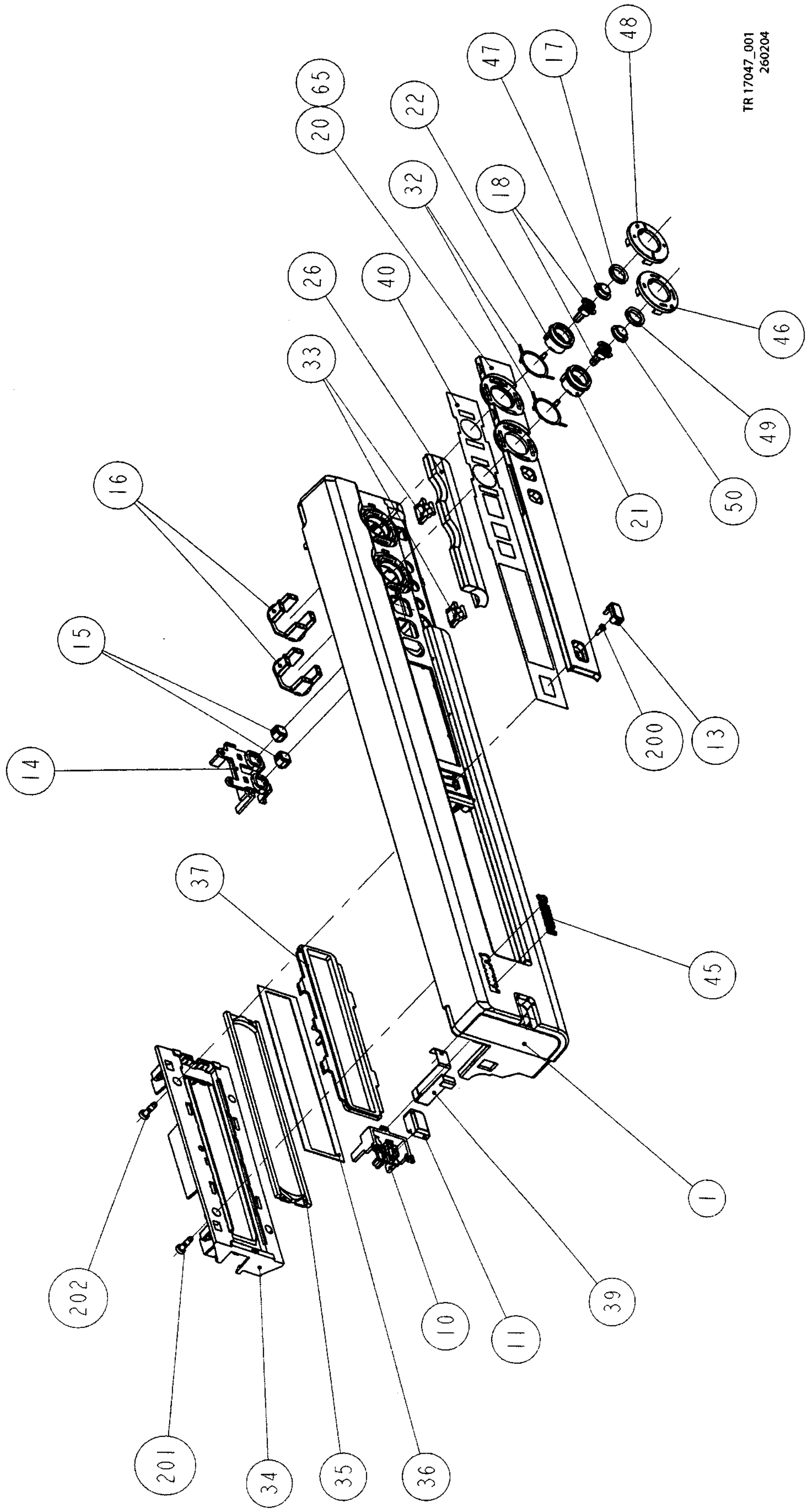

TR 17047_001
260204
65
20
22
47
17
48
32
18
26
40
33
16
15
14
46
49
50
21
200
13
37
45
1
202
39
10
11
201
34
35
36

Figure 10-3

Mechanical

	3122 785 90650	FORMAT DVD HDRW720, please see chapter 5.6
	3122 785 90740	FORMAT DVD DVDR725H, please see chapter 5.6
0001	3103 607 90711	FRONT PANEL HDRW720
0001	3103 607 91051	FRONT PANEL DVDR725H
0011	3103 607 50341	BUTTON CAP STAND BY
0013	3103 607 50361	BUTTON CAP OPEN CL.
0015	3103 607 51200	BUTTON CAP EPG
0020	3103 607 51091	DISPLAY WINDOW
0026	3103 607 51131	FLAP HDRW
0033	3103 604 00441	HINGE DOOR FRONT AV
0046	3103 607 51111	RING ROCKER CURSOR
0047	3103 607 50411	BUTTON CAP RECORD
0048	3103 607 51101	RING ROCKER PL / PAUSE
0050	3103 607 51121	BUTTON CAP RECORD
0070	3103 607 90751	COVER TRAY ASSY HDRW
0072	3103 607 90751	COVER TRAY ASSY HDRW
0105	3103 607 50491	FOOT ASSY
0164	3103 604 01651	BRACKET FAN 45 DAMPED
0169	3103 607 10011	FAN KD1206PTS3-H.C112
0170	3103 607 10071	FAN KD1245PFV-311.MSB1068.A
0171	3103 604 01631	DAMPER FAN 10MM
0172	3103 604 01631	DAMPER FAN 10MM
0173	3103 604 01631	DAMPER FAN 10MM
0179	3103 607 51151	COVER HDRW
0190	3103 607 51151	COVER HDRW
0277	4822 502 30411	PL3 X16PAN<STZNBK
0278	4822 502 30411	PL3 X16PAN<STZNBK
0350	3128 147 15791	RC19046006/01
0351▲	2422 070 98133	MAINSCORD EUR 1M5 BK
0351▲	4822 321 10713	MAINS CORD UK
0352	2422 076 00532	CBLE SCART 1M5
0357	4822 320 50377	CONNECT. CABLE PAL
0358	2422 076 00522	CABLE PHONE 2P IR-LED
1008 ▲	2722 171 00137	POW SUPP MOD DVD+RW AC6220-2 B
1011	3103 608 51181	PBAS IDE AV3
1200 ▲	2822 062 00053	'HDD 3.5"160GB WD1600BB (WESTERN DIGITAL), see chapter 5.6 for instructions
1200 ▲	2822 062 00045	'HDD 3.5"160GB 4R160L0 (MAXTOR), see chapter 5.6 for instructions
1200	2822 062 41027	'HDD 3.5" 80GB 4R080L0 (MAXTOR), see chapter 5.6 for instructions
8004	3103 601 00220	FFC 10-POL-D-TYP 350MM (UP-DB)
8006	3103 601 00491	FFC 22P/170/22P BD UL (EPG-DB)
8008	3103 601 00441	CBLE KR 12P/130/12P UL
8009	3103 601 00661	IDE-CABLE 440MM
8011	3103 601 00290	FFC 10-POL-D-TYP 360MM (AB-EP)
8012	3103 601 00471	CBLE EHR 4P/180/4P LC UL
8013	3103 601 00310	KR 9POL GESCH 370MM
8015	3103 601 00320	FFC 7-POL-D-TYP 280MM (DIO-EP)
8016	3103 601 00330	FFC 4-POL-D-TYP 190MM (DIO-EP)
8017	3103 601 00340	FFC 10-POL-A-TYP 210MM (EP-DC)
8018▲	3103 601 00691	FFC 40POL
8019▲	3103 601 00681	IEEE 1394 390MM
8020	3103 601 00370	FFC 6-POL-D-TYP 220MM (DIO-DB)
8021	3103 601 00380	FFC 22-POL-D-TYP 175MM (AB-EP)
8026	3103 601 00431	FFC 22-POL-A-TYP 245MM (AB-DB)
8027	3103 601 00451	FFC 7-POL-A-TYP 155MM (EPG-DB)
8028▲	3103 601 00671	KR 2POL 300MM

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5000	2422 549 00107	FERRITE CORE RP 25X5X12

Display Board

Various

1110	4822 242 82114	EFOEC8004/T4
1130	4822 276 13732	Tact switch
1160	4822 276 13732	Tact switch
1161	4822 276 13732	Tact switch
1162	4822 276 13732	Tact switch
1163	4822 276 13732	Tact switch
1164	4822 276 13732	Tact switch
1165	4822 276 13732	Tact switch
1166	4822 276 13732	Tact switch
1167	4822 276 13732	Tact switch
1168	4822 276 13732	Tact switch
1169	4822 276 13732	Tact switch
1170	4822 276 13732	Tact switch
1171	4822 276 13732	Tact switch
1172	4822 276 13732	Tact switch
1910	2422 025 18143	CON V 10P F
1910	4822 267 11031	10P. FEM. V
1911	3103 601 00160	CABLE TREE ASSY 4 POL
1920	2422 026 05301	SOC CINCH V 3P
1921	2422 026 05307	CON MDIN H 4P F YKF51
1922	2422 025 10185	CON H 9P M
1940	3103 601 00170	CABLE TREE ASSY 3 POL
1941	3103 601 00180	CABLE TREE ASSY 2 POL

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2100	5322 126 11583	10nF 10% 50V 0603
2101	3198 017 34730	47nF 16V 0603
2102	4822 124 11946	22µF 20% 16V
2103	5322 126 11583	10nF 10% 50V 0603
2104	2238 586 59812	100nF 20-80% 50V 0603
2110	4822 124 21732	10µF 20% 25V
2111	3198 017 34730	47nF 16V 0603
2112	4822 126 13879	220nF 20% 16V
2113	5322 121 42498	680nF 5% 63V
2114	5322 126 11578	1nF 10% 50V 0603
2115	3198 024 44730	47nF 50V 0603
2116	4822 124 11946	22µF 20% 16V
2117	4822 124 81151	22µF 50V
2118	2020 552 94427	100pF 5% 50v 0603
2119	2020 552 94427	100pF 5% 50v 0603
2120	2020 552 94427	100pF 5% 50v 0603
2121	2020 552 94427	100pF 5% 50v 0603
2122	2020 552 94427	100pF 5% 50v 0603
2123	2020 552 94427	100pF 5% 50v 0603
2124	2020 552 94427	100pF 5% 50v 0603
2125	2020 552 94427	100pF 5% 50v 0603
2126	2020 552 94427	100pF 5% 50v 0603
2200	4822 126 14241	330pF 50V 0603
2201	4822 126 14241	330pF 50V 0603
2202	2238 586 59812	100nF 20-80% 50V 0603

-WW-

3100	4822 051 30223	22kΩ 5% 0.062W
3101	4822 051 30223	22kΩ 5% 0.062W
3102	4822 051 30222	2.2kΩ 5% 0.062W
3103	4822 051 30221	220Ω 5% 0.062W
3104	4822 051 30103	10kΩ 5% 0.062W
3105	4822 051 30222	2.2kΩ 5% 0.062W
3106	4822 117 12925	47kΩ 1% 0.063W 0603
3107	4822 051 30222	2.2kΩ 5% 0.062W
3108	4822 117 12925	47kΩ 1% 0.063W 0603
3109	4822 051 30222	2.2kΩ 5% 0.062W
3110	4822 051 30221	220Ω 5% 0.062W
3111	4822 051 30223	22kΩ 5% 0.062W
3112	4822 050 11002	1kΩ 1% 0.4W
3113	4822 051 30102	1kΩ 5% 0.062W
3114	4822 051 30101	100Ω 5% 0.062W
3115	4822 051 30101	100Ω 5% 0.062W
3116	4822 051 30331	330Ω 5% 0.062W
3117	4822 051 30103	10kΩ 5% 0.062W
3118	4822 051 30331	330Ω 5% 0.062W
3119	4822 051 30471	470Ω 5% 0.062W
3120	4822 051 30102	1kΩ 5% 0.062W
3121	4822 116 83872	220Ω 5% 0.5W
3122	4822 051 30103	10kΩ 5% 0.062W
3123	4822 051 30471	470Ω 5% 0.062W
3124	4822 051 30103	10kΩ 5% 0.062W
3125	4822 051 30471	470Ω 5% 0.062W
3126	4822 051 30101	100Ω 5% 0.062W
3127	4822 117 13632	100kΩ 1% 0603 0.62W
3128	4822 117 13632	100kΩ 1% 0603 0.62W
3129	4822 051 30102	1kΩ 5% 0.062W
3130	4822 051 30103	10kΩ 5% 0.062W
3131	4822 050 11002	1kΩ 1% 0.4W
3132	4822 051 30102	1kΩ 5% 0.062W
3134	4822 117 12063	NTC DC 5W 10K 5%
3135	4822 051 30472	4.7kΩ 5% 0.062W
3136	4822 116 52213	180Ω 5% 0.5W
3137	4822 116 83876	270Ω 5% 0.5W
3138	4822 116 52213	180Ω 5% 0.5W
3139	4822 116 83876	270Ω 5% 0.5W
3140	4822 051 30103	10kΩ 5% 0.062W
3141	4822 117 12925	47kΩ 1% 0.063W 0603
3143	4822 051 30102	1kΩ 5% 0.062W
3144	4822 051 30103	10kΩ 5% 0.062W
3145	4822 051 30103	10kΩ 5% 0.062W
3146	4822 051 30223	22kΩ 5% 0.062W
3147	4822 116 52257	22kΩ 5% 0.5W
3148	4822 116 52257	22kΩ 5% 0.5W
3149	4822 116 52257	22kΩ 5% 0.5W
3150	4822 051 30223	22kΩ 5% 0.062W
3151	4822 051 30223	22kΩ 5% 0.062W
3152	4822 051 30223	22kΩ 5% 0.062W
3153	4822 051 30223	22kΩ 5% 0.062W
3155	4822 116 52249	1k8 5% 0.5W
3156	4822 116 52243	1.5kΩ 5% 0.5W
3157	4822 116 52249	1k8 5% 0.5W
3159	4822 116 83883	470Ω 5% 0.5W
3160	4822 051 30471	470Ω 5% 0.062W
3161	4822 051 30223	22kΩ 5% 0.062W
3200	4822 051 30102	1kΩ 5% 0.062W
3201	4822 051 30105	1MΩ 5% 0.062W
3202	4822 051 30102	1kΩ 5% 0.062W
3203	4822 051 30105	1MΩ 5% 0.062W
3204	4822 051 30689	68Ω 5% 0.063W 0603
3205	4822 051 30759	75Ω 5% 0.062W
3206	4822 051 30759	75Ω 5% 0.062W
3207	4822 051 30759	75Ω 5% 0.062W
3300	4822 051 30472	4.7kΩ 5% 0.062W
3301	4822 116 83876	270Ω 5% 0.5W
3302	4822 116 83876	270Ω 5% 0.5W
3303	4822 116 83876	270Ω 5% 0.5W
3304	4822 116 83876	270Ω 5% 0.5W
3400	4822 051 30681	680Ω 5% 0.062W
3500	4822 051 30681	680Ω 5% 0.062W
4111	4822 051 30008	Jumper 0603
4121	4822 051 30008	Jumper 0603
4122	4822 051 30008	Jumper 0603
4123	4822 051 30008	Jumper 0603
4124	4822 051 30008	Jumper 0603
4199	4822 051 30008	Jumper 0603

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5100	4822 157 11706	10µH 5%
5101	2422 549 44607	Bead 600Ω at 100MHz
5103	2422 549 44607	Bead 600Ω at 100MHz
5104	4822 157 50964	100µH 20%

▶|

6100	4822 130 11416	PDZ6.8B
6101	9322 190 44676	LTL-1MHHR
6102	9322 190 44676	LTL-1MHHR
6103	9322 190 44676	LTL-1MHHR
6105	4822 130 11397	BAS316
6106	4822 130 11397	BAS316
6107	9322 200 25676	LW3333-T1U1-5-0-20*
6109	4822 130 11397	BAS316
6111	4822 130 11397	BAS316
6112	4822 130 11397	BAS316
6120	9965 000 05596	LTL42UB6N
6121	9965 000 05596	LTL42UB6N
6122	9965 000 05596	LTL42UB6N
6200	9322 146 61685	DF3A6.8FU
6201	9322 146 61685	DF3A6.8FU
6202	9322 146 61685	DF3A6.8FU
6203	9322 146 61685	DF3A6.8FU
6204	9322 146 61685	DF3A6.8FU
6400	9322 190 34685	LST670-J2L1-1
6400	9322 203 48685	LTST-T670KRK
6401	9322 190 34685	LST670-J2L1-1
6401	9322 203 48685	LTST-T670KRK
6402	9322 190 34685	LST670-J2L1-1
6402	9322 203 48685	LTST-T670KRK
6500	9322 190 34685	LST670-J2L1-1
6500	9322 203 48685	LTST-T670KRK
6501	9322 190 34685	LST670-J2L1-1
6501	9322 203 48685	LTST-T670KRK
6502	9322 190 34685	LST670-J2L1-1
6502	9322 203 48685	LTST-T670KRK

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7100	2722 171 07736	VFD BJ900GNK
7100	2722 171 07744	DISPLAY HUA-09SS47T
7101	3198 010 42310	BC847BW
7102	3198 010 42310	BC847BW
7103	3103 165 13731	TMP87C874F/LDCP1
7104	3198 010 42310	BC847BW
7105	3198 010 42310	BC847BW
7106	4822 130 40981	BC337-25
7107	9322 185 95667	TSOP4836
7108	4822 130 41246	BC327-25
7109	3198 010 42310	BC847BW

7110	3198 010 42310	BC847BW
7111	3198 010 42310	BC847BW
7112	4822 130 60854	DTA124EU-W
7300	4822 130 61553	DTC124EU
7301	4822 130 61553	DTC124EU

Analog Board

Various

1001▲	2422 086 10919	Fuse 65V 125mA
1300▲	4822 253 30383	19181 (2,5A)
1302▲	4822 252 11215	Spark gap
1303▲	4822 071 51002	19372(1A)
1304▲	2422 086 10786	FUSE 4A
1304▲	9965 000 07786	Fuse T4.0A 250V
1306▲	2422 086 10919	Fuse 65V 125mA
1307▲	4822 071 51002	19372(1A)
1308▲	2422 086 10951	PROT DEV 65V 500MA PSC
1308▲	4822 252 51187	19398E1(0,500A)
1309▲	2422 086 10783	FUSE RAD LT 2A 250V IEC A
1309▲	9965 000 07788	FUSE RAD T2A IEC UL250V
1600	4822 242 10434	Crystal 18.432 MHz
1701	4822 242 81436	Filter OFWK3953M
1702	2422 549 44341	SAW 38.9MHz OFWK9656M
1703	4822 242 10307	OFWG3956M
1703	4822 242 81436	Filter OFWK3953M
1704	2422 549 44611	FIL CER 5MHZ5 TPSR*MBQ2 BS
1704	4822 242 72586	TPS5,5MB-TF20
1705	3139 147 17001	TUNER UV1316MK3
1706	4822 242 81572	TPS6,0MB-TF21
1900	2422 025 18009	CON V 22P F
1900	4822 265 11154	Connector 22p
1931▲	2422 030 00304	Socket 2P m h mains
1931▲	2422 030 00413	SOC POW 2P M
1932	2422 025 10772	CON V 12P M
1934	4822 267 10565	Connector 4p
1935	2422 025 09405	CON 2P M
1940	2422 033 00334	CON BM EURO H 42P
1942	2422 025 10769	CON 9P VERT
1943	2422 025 18143	CON V 10P F
1943	4822 267 11031	10P. FEM. V
1947	2422 025 18009	CON V 22P F
1947	4822 265 11154	Connector 22p
1948	4822 267 10994	Socket SVHS
1949	2422 026 05308	SOC CINCH H 3P
1990	4822 242 73552	13,875 000 MC

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2000	4822 124 80483	47µF20% 6,3V
2001	4822 124 42234	100µF 20% 6,3V
2002	4822 124 42234	100µF 20% 6,3V
2003	2238 586 59812	100nF 20-80% 50V 0603
2004	2238 586 59812	100nF 20-80% 50V 0603
2006	2238 916 11449	1NF 2% NPO 25V 0603
2008	2238 916 11449	1NF 2% NPO 25V 0603
2009	2020 552 94427	100pF 5% 50v 0603
2011	2238 586 59812	100nF 20-80% 50V 0603
2012	2238 586 59812	100nF 20-80% 50V 0603
2015	3198 017 41050	1µF 10V 0603
2017	2020 552 94427	100pF 5% 50v 0603
2018	4822 124 21732	10µF 20% 25V
2019	4822 124 21732	10µF 20% 25V
2020	4822 124 21732	10µF 20% 25V
2021	2238 586 59812	100nF 20-80% 50V 0603
2022	3198 017 41050	1µF 10V 0603
2023	2238 916 11449	1NF 2% NPO 25V 0603
2025	2238 916 11449	1NF 2% NPO 25V 0603
2030	2238 916 11449	1NF 2% NPO 25V 0603
2032	2238 916 11449	1NF 2% NPO 25V 0603
2033	2020 552 94427	100pF 5% 50v 0603
2035	2238 586 59812	100nF 20-80% 50V 0603
2037	2238 586 59812	100nF 20-80% 50V 0603
2038	4822 124 42234	100µF 20% 6,3V
2041	2020 552 94427	100pF 5% 50v 0603
2042	2238 586 59812	100nF 20-80% 50V 0603
2043	4822 124 80483	47µF20% 6,3V
2045	2238 916 11449	1NF 2% NPO 25V 0603
2047	2238 916 11449	1NF 2% NPO 25V 0603
2048	2020 009 90097	100µF BP 16V 20%
2048	2022 036 00005	10µF 16V 20%
2048	4822 124 12392	47?F 20% 16V
2049	5322 126 11583	10nF 10% 50V 0603
2050	2020 009 90097	100µF BP 16V 20%
2050	2022 036 00005	10µF 16V 20%
2050	4822 124 12392	47?F 20% 16V
2301▲	2020 554 90173	2.2nF 20% 250V
2302▲	4822 121 10512	220nF 275V 20%
2303	4822 122 31175	1nF 10% 500V
2304▲	4822 121 51598	2.2nF 5% 400V
2305	2020 021 91506	1000µF 20% 16V
2306	2020 021 91528	560µF 6V3 20%
2307	4822 122 31175	1nF 10% 500V
2308	2022 318 00108	47nF 250V 10%
2308	4822 121 70386	47nF 10% 250V
2309▲	2222 151 90053	68µF 400V 20%
2310	5322 126 11578	1nF 10% 50V 0603
2311	5322 126 11578	1nF 10% 50V 0603
2312	2020 021 91506	1000µF 20% 16V
2313	2020 021 91528	560µF 6V3 20%
2315▲	4822 126 14525	47pF 5% 1kV
2317	5322 126 11578	1nF 10% 50V 0603
2318	4822 126 10206	2.2nF 10% 500V
2319	2020 021 91506	1000µF 20% 16V
2320	4822 124 40849	330µF 20% 16V
2321	2238 586 59812	100nF 20-80% 50V 0603
2323	4822 124 42234	100µF 20% 6,3V
2324	2238 586 59812	100nF 20-80% 50V 0603
2325	4822 124 81151	22µF 50V
2326	4822 121 41857	10nF 5% 250V
2327	2238 586 59812	100nF 20-80% 50V 0603
2328	4822 124 81151	22µF 50V
2329	2238 586 59812	100nF 20-80% 50V 0603
2330	5322 126 11578	1nF 10% 50V 0603
2331	2238 586 59812	100nF 20-80% 50V 0603
2332	4822 124 22651	1µF 20% 50V
2334	2238 586 59812	100nF 20-80% 50V 0603
2335	4822 124 21732	10µF 20% 25V
2336	2238 586 59812	100nF 20-80% 50V 0603
2338	2238 586 59812	100nF 20-80% 50V 0603
2339	3198 017 41050	1µF 10V 0603
2340▲	2020 554 90169	470pF 250V 10%
2341	3198 017 41050	1µF 10V 0603
2342	3198 017 41050	1µF 10V 0603
2343	2238 586 59812	100nF 20-80% 50V 0603
2344	4822 124 11912	220µF 20% 6.3V
2402	2238 586 59812	100nF 20-80% 50V 0603
2403	4822 124 80483	47µF20% 6,3V
2404	2238 586 59812	100nF 20-80% 50V 0603
2405	4822 124 80483	47µF20% 6,3V
2406	5322 126 11583	10nF 10% 50V 0603
2407	4822 122 33741	10pF 10% 50V
2408	3198 017 41050	1µF 10V 0603
2409	2238 586 59812	100nF 20-80% 50V 0603
2410	3198 017 41050	1µF 10V 0603
2411	2238 586 59812	100nF 20-80% 50V 0603
2412	4822 122 33741	10pF 10% 50V
2413	4822 124 80483	47µF20% 6,3V
2414	2238 586 59812	100nF 20-80% 50V 0603
2416	3198 017 41050	1µF 10V 0603
2417	4822 124 11947	10?F 20% 16V
2418	3198 017 41050	1µF 10V 0603
2419	3198 017 41050	1µF 10V 0603
2420	2238 586 59812	100nF 20-80% 50V 0603
2421	4822 124 11947	10?F 20% 16V
2422	5322 126 11583	10nF 10% 50V 0603
2423	3198 017 41050	1µF 10V 0603
2424	4822 124 80483	47µF20% 6,3V
2425	2238 586 59812	100nF 20-80% 50V 0603
2427	3198 017 41050	1µF 10V 0603
2428	4822 124 11947	10?F 20% 16V
2429	4822 124 11946	22µF 20% 16V
2430	2238 586 59812	100nF 20-80% 50V 0603
2432	4822 124 42234	100µF 20% 6,3V
2433	3198 017 34730	47nF 16V 0603
2434	4822 124 80483	47µF20% 6,3V
2435	2238 586 59812	100nF 20-80% 50V 0603
2436	3198 017 41050	1µF 10V 0603
2437	3198 017 41050	1µF 10V 0603
2438	3198 017 41050	1µF 10V 0603
2439	2238 586 59812	100nF 20-80% 50V 0603
2440	3198 017 41050	1µF 10V 0603
2441	3198 017 41050	1µF 10V 0603
2442	4822 124 11946	22µF 20% 16V
2443	4822 124 42234	100µF 20% 6,3V
2444	4822 126 13881	470pF 5% 50V
2445	4822 126 13881	470pF 5% 50V
2446	3198 017 41050	1µF 10V 0603
2447	4822 126 13881	470pF 5% 50V
2448	4822 126 13881	470pF 5% 50V
2450	2238 586 59812	100nF 20-80% 50V 0603
2459	3198 017 41050	1µF 10V 0603
2460	4822 124 40769	4.7µF 20% 100V
2461	4822 124 40769	4.7µF 20% 100V
2462	4822 124 11947	10?F 20% 16V
2463	4822 124 11947	10?F 20% 16V
2464	4822 124 21732	10µF 20% 25V
2501	3198 017 41050	1µF 10V 0603
2502	2238 586 59812	100nF 20-80% 50V 0603
2503	2238 586 59812	100nF 20-80% 50V 0603
2504	3198 017 41050	1µF 10V 0603
2505	3198 017 41050	1µF 10V 0603
2506	3198 017 41050	1µF 10V 0603
2507	3198 017 41050	1µF 10V 0603
2508	3198 017 41050	1µF 10V 0603
2509	2238 586 59812	100nF 20-80% 50V 0603
2510	4822 124 42234	100µF 20% 6,3V
2511	2020 009 90097	100µF BP 16V 20%
2511	2022 036 00005	10µF 16V 20%
2512	2238 586 59812	100nF 20-80% 50V 0603
2513	2020 552 96807	1µF 10V 0603 X5R
2514	2238 586 59812	100nF 20-80% 50V 0603
2515	2020 552 96807	1µF 10V 0603 X5R
2516	2020 009 90097	100µF BP 16V 20%
2516	2022 036 00005	10µF 16V 20%
2517	5322 126 11578	1nF 10% 50V 0603
2518	2238 586 59812	100nF 20-80% 50V 0603
2519	4822 124 42234	100µF 20% 6,3V
2520	5322 126 11578	1nF 10% 50V 0603
2521	2238 586 59812	100nF 20-80% 50V 0603
2522	2020 009 90097	100µF BP 16V 20%
2522	2022 036 00005	10µF 16V 20%
2523	5322 126 11578	1nF 10% 50V 0603
2524	3198 017 41050	1µF 10V 0603
2525	3198 017 41050	1µF 10V 0603
2526	2020 009 90097	100µF BP 16V 20%
2526	2022 036 00005	10µF 16V 20%
2527	5322 126 11578	1nF 10% 50V 0603
2530	2238 586 59812	100nF 20-80% 50V 0603
2535	2238 586 59812	100nF 20-80% 50V 0603
2536	2238 586 59812	100nF 20-80% 50V 0603
2600	4822 124 21732	10µF 20% 25V
2601	5322 126 11583	10nF 10% 50V 0603
2602	4822 124 21732	10µF 20% 25V
2603	2238 586 59812	100nF 20-80% 50V 0603
2604	5322 126 11583	10nF 10% 50V 0603
2605	4822 124 21732	10µF 20% 25V
2606	2238 586 59812	100nF 20-80% 50V 0603
2607	4822 126 14225	56pF 5% 50V 0603
2608	4822 124 21732	10µF 20% 25V
2609	4822 126 14225	56pF 5% 50V 0603
2610	5322 126 11583	10nF 10% 50V 0603
2611	4822 124 80231	47µF20% 16V
2612	4822 124 40769	4.7µF 20% 100V
2616	5322 126 11578	1nF 10% 50V 0603
2617	5322 126 11578	1nF 10% 50V 0603
2620	3198 016 33380	3.3pF 50V 0603
2621	3198 016 33380	3.3pF 50V 0603
2623	2238 586 59812	100nF 20-80% 50V 0603
2713	4822 124 11946	22µF 20% 16V
2719	4822 126 13883	220pF 5% 50V
2720	4822 124 42234	100µF 20% 6,3V
2721	5322 122 33861	120pF10% 50V
2722	2022 020 00861	2.2µF 50V 20%
2722	5322 124 41379	2.2?F 20% 50V
2723	4822 126 13881	470pF 5% 50V
2724	2238 586 59812	100nF 20-80% 50V 0603
2725	4822 122 33761	22pF 5% 50V
2727	2238 586 59812	100nF 20-80% 50V 0603
2728	5322 126 11583	10nF 10% 50V 0603
2729	4822 124 21732	10µF 20% 25V
2730	4822 126 13879	220nF 20% 16V
2731	2020 552 94523	8.2pF 50V 0603
2732	4822 124 22652	2.2µF 20% 50V
2733	2238 586 59812	100nF 20-80% 50V 0603
2734	5322 126 11578	1nF 10% 50V 0603
2735	4822 126 11669	27pF 5% 50V 0603
2736	4822 126 11669	27pF 5% 50V 0603
2737	4822 124 80483	47µF20% 6,3V
2740	4822 124 22652	2.2µF 20% 50V
2741	5322 126 11578	1nF 10% 50V 0603
2742	5322 126 11578	1nF 10% 50V 0603
2932	2238 586 59812	100nF 20-80% 50V 0603
2933	4822 124 80483	47µF20% 6,3V
2934	2238 586 59812	100nF 20-80% 50V 0603
2935	2238 586 59812	100nF 20-80% 50V 0603
2936	4822 122 33761	22pF 5% 50V
2937	4822 122 33761	22pF 5% 50V
2938	2238 586 59812	100nF 20-80% 50V 0603
2940	2238 586 59812	100nF 20-80% 50V 0603
2941	4822 124 21732	10µF 20% 25V
2942	4822 126 14238	2.2nF 50V 0603
2943	4822 126 14508	180pF 5% 50V
2944	4822 126 14238	2.2nF 50V 0603
2945	4822 126 14508	180pF 5% 50V
2946	3198 017 41050	1µF 10V 0603
2947	3198 017 41050	1µF 10V 0603

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3001	5322 117 13031	5.6kΩ 1% 0603
3004	2120 108 93058	33kΩ 1% 0603
3004	2322 704 63303	33k 1% 0603
3005	4822 051 30472	4.7kΩ 5% 0.062W
3006	4822 051 30472	4.7kΩ 5% 0.062W

3008	2322 704 62703	27kΩ 1% 0603
3009	5322 117 13031	5.6kΩ 1% 0603
3010	5322 117 13053	6.8kΩ 1% 0.063W 0603
3011	4822 117 13632	100kΩ 1% 0603 0.62W
3012	4822 051 30103	10kΩ 5% 0.062W
3013	5322 117 13053	6.8kΩ 1% 0.063W 0603
3014	5322 117 13031	5.6kΩ 1% 0603
3015	4822 051 30471	470Ω 5% 0.062W
3016	2322 704 62703	27kΩ 1% 0603
3017	2120 108 93058	33kΩ 1% 0603
3017	2322 704 63303	33k 1% 0603
3018	5322 117 13031	5.6kΩ 1% 0603
3019	4822 116 52186	22Ω 5% 0.5W
3020	4822 051 30472	4.7kΩ 5% 0.062W
3021	4822 051 30103	10kΩ 5% 0.062W
3022	4822 117 12139	22Ω 5% 0.062W
3023	4822 117 12139	22Ω 5% 0.062W
3024	4822 117 12139	22Ω 5% 0.062W
3025	4822 117 13632	100kΩ 1% 0603 0.62W
3026	4822 117 12139	22Ω 5% 0.062W
3027	2120 108 93058	33kΩ 1% 0603
3027	2322 704 63303	33k 1% 0603
3028	4822 117 12139	22Ω 5% 0.062W
3029	4822 051 30101	100Ω 5% 0.062W
3030	2322 704 62703	27kΩ 1% 0603
3031	4822 051 30103	10kΩ 5% 0.062W
3032	5322 117 13053	6.8kΩ 1% 0.063W 0603
3033	4822 117 12139	22Ω 5% 0.062W
3034	4822 117 13613	2R2 5% 0603
3035	4822 117 13613	2R2 5% 0603
3036	5322 117 13053	6.8kΩ 1% 0.063W 0603
3039	2322 704 62703	27kΩ 1% 0603
3040	2120 108 93058	33kΩ 1% 0603
3040	2322 704 63303	33k 1% 0603
3042	4822 050 21003	10kΩ 1% 0.6W
3043	4822 117 12925	47kΩ 1% 0.063W 0603
3044	4822 117 12925	47kΩ 1% 0.063W 0603
3045	4822 051 30102	1kΩ 5% 0.062W
3047	4822 050 21003	10kΩ 1% 0.6W
3049	4822 051 30472	4.7kΩ 5% 0.062W
3051	4822 117 13632	100kΩ 1% 0603 0.62W
3052	4822 051 30223	22kΩ 5% 0.062W
3053	4822 050 21003	10kΩ 1% 0.6W
3054	4822 117 12139	22Ω 5% 0.062W
3300▲	4822 053 21335	3.3MΩ 5% 0.5W
3301▲	4822 053 21335	3.3MΩ 5% 0.5W
3302	4822 051 30102	1kΩ 5% 0.062W
3303	4822 051 30102	1kΩ 5% 0.062W
3304	4822 051 30103	10kΩ 5% 0.062W
3306	4822 116 83872	220Ω 5% 0.5W
3307	4822 051 30103	10kΩ 5% 0.062W
3308	4822 116 52272	330k 5% 0.5W
3309	4822 116 52272	330k 5% 0.5W
3310	4822 116 52272	330k 5% 0.5W
3311	4822 051 30102	1kΩ 5% 0.062W
3312	4822 051 30221	220Ω 5% 0.062W
3313	4822 116 52234	100kΩ 5% 0,5W
3314	2322 704 61002	1kΩ 0603 RC22H PM1
3314	4822 117 13611	1KΩ 1% 0603 ERJ3E
3315	4822 117 12902	8.2kΩ 1% 0.063W 0603
3315	5322 117 13056	8.2K 1% 0.063W 0603
3316	5322 117 13026	4.7kΩ 1% 0.063W 0603
3317	4822 051 30102	1kΩ 5% 0.062W
3318	4822 116 52175	100Ω 5% 0.5W
3321	2322 193 14477	0.47Ω PR01 PM5
3323	4822 117 12891	220kΩ 1% 0.063W 0603
3324	2322 702 60564	560kΩ 5% 0603
3325	4822 117 12925	47kΩ 1% 0.063W 0603
3326	4822 116 52195	47Ω 5% 0.5W
3327	4822 051 30105	1MΩ 5% 0.062W
3328	4822 051 30103	10kΩ 5% 0.062W
3329	3198 021 32250	2.2MΩ 5% 0603
3330	4822 051 30471	470Ω 5% 0.062W
3331	4822 051 30109	10Ω 5% 0.062W
3332	5322 117 13031	5.6kΩ 1% 0603
3333	5322 117 13026	4.7kΩ 1% 0.063W 0603
3334	4822 051 30563	56kΩ 5% 0.062W
3335	4822 051 30471	470Ω 5% 0.062W
3336	4822 051 30471	470Ω 5% 0.062W
3337	4822 051 30102	1kΩ 5% 0.062W
3338	4822 051 30221	220Ω 5% 0.062W
3339	5322 117 13026	4.7kΩ 1% 0.063W 0603
3340	5322 117 13026	4.7kΩ 1% 0.063W 0603
3341	4822 051 30683	68kΩ 5% 0.062W
3342	4822 116 52283	4.7kΩ 5% 0.5W
3343	5322 117 13026	4.7kΩ 1% 0.063W 0603
3344	4822 117 12925	47kΩ 1% 0.063W 0603
3346	4822 051 30222	2.2kΩ 5% 0.062W
3347	4822 051 30472	4.7kΩ 5% 0.062W
3348	4822 051 30681	680Ω 5% 0.062W
3349	4822 051 30479	47Ω 5% 0.062W
3350	4822 051 30102	1kΩ 5% 0.062W
3351	4822 051 30105	1MΩ 5% 0.062W
3352	2322 193 14687	0.68Ω PR01 PM5
3353	4822 051 30272	2.7kΩ 5% 0.062W
3354	4822 051 30272	2.7kΩ 5% 0.062W
3355	4822 051 30479	47Ω 5% 0.062W
3356	4822 116 52231	820Ω 5% 0.5W
3357	4822 051 30472	4.7kΩ 5% 0.062W
3358	4822 051 30109	10Ω 5% 0.062W
3360	4822 116 52231	820Ω 5% 0.5W
3361	4822 051 30102	1kΩ 5% 0.062W
3362	4822 051 30681	680Ω 5% 0.062W
3363	4822 051 30222	2.2kΩ 5% 0.062W
3364	4822 051 30103	10kΩ 5% 0.062W
3365	4822 051 30332	3.3kΩ 5% 0.062W
3366	4822 051 30152	1.5kΩ 5% 0.062W
3367	4822 117 12903	1.8kΩ 1% 0.063W 0603
3368	4822 051 30152	1.5kΩ 5% 0.062W
3371	4822 051 30479	47Ω 5% 0.062W
3372	4822 051 30339	33Ω 5% 0.062W
3373	4822 051 30339	33Ω 5% 0.062W
3374	4822 051 30471	470Ω 5% 0.062W
3378	4822 051 30152	1.5kΩ 5% 0.062W
3401	5322 117 13055	75R 1% 0.063W 0603
3402	5322 117 13055	75R 1% 0.063W 0603
3403	5322 117 13055	75R 1% 0.063W 0603
3404	4822 051 30759	75Ω 5% 0.062W
3405	4822 051 30223	22kΩ 5% 0.062W
3406	4822 117 12891	220kΩ 1% 0.063W 0603
3407	4822 051 30332	3.3kΩ 5% 0.062W
3408	4822 051 30392	3.9kΩ 5% 0.063W 0603
3409	5322 117 13055	75R 1% 0.063W 0603
3410	5322 117 13055	75R 1% 0.063W 0603
3411	4822 051 30759	75Ω 5% 0.062W
3412	4822 116 52201	75Ω 5% 0.5W
3413	5322 117 13055	75R 1% 0.063W 0603
3414	4822 051 30759	75Ω 5% 0.062W
3415	4822 051 30102	1kΩ 5% 0.062W
3416	4822 051 30472	4.7kΩ 5% 0.062W
3417	4822 051 30759	75Ω 5% 0.062W
3418	4822 117 13632	100kΩ 1% 0603 0.62W
3419	4822 051 30223	22kΩ 5% 0.062W
3420	4822 051 30151	150Ω 5% 0.062W
3421	4822 051 30273	27kΩ 5% 0.062W
3422	4822 116 52231	820Ω 5% 0.5W
3423	4822 051 30391	390Ω 5% 0.062W
3424	4822 051 30333	33kΩ 5% 0.062W
3425	4822 051 30471	470Ω 5% 0.062W
3426	4822 051 30333	33kΩ 5% 0.062W
3427	4822 051 30759	75Ω 5% 0.062W
3428	4822 117 13632	100kΩ 1% 0603 0.62W
3429	4822 117 12925	47kΩ 1% 0.063W 0603
3431	4822 051 30472	4.7kΩ 5% 0.062W
3432	4822 116 52175	100Ω 5% 0.5W
3433	4822 116 52175	100Ω 5% 0.5W
3434	4822 116 52283	4.7kΩ 5% 0.5W
3435	4822 116 52201	75Ω 5% 0.5W
3436	4822 116 52199	68Ω 5% 0.5W
3437	4822 051 30103	10kΩ 5% 0.062W
3438	4822 051 30103	10kΩ 5% 0.062W
3439	4822 051 30103	10kΩ 5% 0.062W
3441	4822 116 52201	75Ω 5% 0.5W
3442	4822 051 30154	150kΩ 5% 0.062W
3443	4822 117 13632	100kΩ 1% 0603 0.62W
3444	4822 117 13632	100kΩ 1% 0603 0.62W
3445	4822 051 30151	150Ω 5% 0.062W
3446	4822 117 12925	47kΩ 1% 0.063W 0603
3447	4822 116 83884	47kΩ 5% 0.5W
3448	4822 051 30271	270Ω 5% 0.062W
3449	4822 051 30151	150Ω 5% 0.062W
3450	4822 051 30271	270Ω 5% 0.062W
3451	4822 050 21003	10kΩ 1% 0.6W
3452	4822 051 30151	150Ω 5% 0.062W
3454	4822 050 11002	1kΩ 1% 0.4W
3455	4822 051 30103	10kΩ 5% 0.062W
3458	5322 117 13056	8.2K 1% 0.063W 0603
3459	4822 051 30103	10kΩ 5% 0.062W
3460	5322 117 13056	8.2K 1% 0.063W 0603
3461▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3461▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3462▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3462▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3463▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3463▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3464▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3464▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3465▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3465▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3466▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3466▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3467▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3467▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3468▲	2122 551 00031	VDR 0805 1mA/6V4 21V
3468▲	2322 574 10402	VDR 0805 1mA/6V4 21V
3469	4822 117 13632	100kΩ 1% 0603 0.62W
3470	4822 117 13632	100kΩ 1% 0603 0.62W
3471	4822 117 13632	100kΩ 1% 0603 0.62W
3472	4822 117 13632	100kΩ 1% 0603 0.62W
3475	4822 051 30101	100Ω 5% 0.062W
3476	4822 051 30101	100Ω 5% 0.062W
3477	4822 051 30101	100Ω 5% 0.062W
3478	4822 051 30101	100Ω 5% 0.062W
3487	4822 117 13632	100kΩ 1% 0603 0.62W
3488	4822 117 13632	100kΩ 1% 0603 0.62W
3489	4822 117 12864	82kΩ 5% 0.6W
3490	4822 051 30151	150Ω 5% 0.062W
3491	4822 051 30151	150Ω 5% 0.062W
3492	4822 051 30151	150Ω 5% 0.062W
3493	4822 051 30151	150Ω 5% 0.062W
3494	4822 051 30151	150Ω 5% 0.062W
3495	4822 051 30471	470Ω 5% 0.062W
3496	4822 051 30471	470Ω 5% 0.062W
3501	4822 051 30102	1kΩ 5% 0.062W
3502	4822 050 11002	1kΩ 1% 0.4W
3503	4822 117 13632	100kΩ 1% 0603 0.62W
3504	4822 117 13632	100kΩ 1% 0603 0.62W
3505	4822 117 13632	100kΩ 1% 0603 0.62W
3506	4822 117 13632	100kΩ 1% 0603 0.62W
3507	4822 117 13632	100kΩ 1% 0603 0.62W
3508	4822 051 30102	1kΩ 5% 0.062W
3509	4822 050 11002	1kΩ 1% 0.4W
3510	4822 117 13632	100kΩ 1% 0603 0.62W
3511	4822 117 13632	100kΩ 1% 0603 0.62W
3512	4822 051 30102	1kΩ 5% 0.062W
3513	4822 051 30102	1kΩ 5% 0.062W
3514	4822 117 13632	100kΩ 1% 0603 0.62W
3515	4822 050 11002	1kΩ 1% 0.4W
3516	4822 117 13632	100kΩ 1% 0603 0.62W
3517	4822 116 52283	4.7kΩ 5% 0.5W
3518	4822 051 30102	1kΩ 5% 0.062W
3519	4822 116 52283	4.7kΩ 5% 0.5W
3520	4822 051 30221	220Ω 5% 0.062W
3521	4822 051 30221	220Ω 5% 0.062W
3522	4822 051 30221	220Ω 5% 0.062W
3523	4822 050 11002	1kΩ 1% 0.4W
3524	4822 117 12968	820Ω 5% 0.62W
3525	4822 051 30221	220Ω 5% 0.062W
3526	4822 051 30102	1kΩ 5% 0.062W
3527	4822 117 12968	820Ω 5% 0.62W
3528	4822 051 30472	4.7kΩ 5% 0.062W
3529	4822 051 30472	4.7kΩ 5% 0.062W
3530	4822 117 12968	820Ω 5% 0.62W
3531	4822 117 12968	820Ω 5% 0.62W
3532	4822 050 11002	1kΩ 1% 0.4W
3533	4822 050 11002	1kΩ 1% 0.4W
3534	4822 117 13632	100kΩ 1% 0603 0.62W
3600	4822 051 30103	10kΩ 5% 0.062W
3601	4822 116 52175	100Ω 5% 0.5W
3602	4822 051 30472	4.7kΩ 5% 0.062W
3603	4822 116 52175	100Ω 5% 0.5W
3611	4822 051 30101	100Ω 5% 0.062W
3612	4822 051 30101	100Ω 5% 0.062W
3701	4822 116 52228	680Ω 5% 0.5W
3702	4822 051 30471	470Ω 5% 0.062W
3703	4822 116 52245	150kΩ 5% 0.5W
3704	4822 051 30221	220Ω 5% 0.062W
3705	4822 051 30103	10kΩ 5% 0.062W
3710	4822 051 30562	5.6kΩ 5% 0.063W 0603
3711	4822 051 30333	33kΩ 5% 0.062W
3714	4822 051 30183	18kΩ 5% 0.062W
3715	4822 051 30103	10kΩ 5% 0.062W
3716	4822 051 30472	4.7kΩ 5% 0.062W
3717	4822 051 30472	4.7kΩ 5% 0.062W
3720	4822 051 30331	330Ω 5% 0.062W
3724	4822 100 12158	22K 30%
3725	5322 117 13056	8.2K 1% 0.063W 0603
3726	4822 051 30101	100Ω 5% 0.062W
3728	4822 051 30101	100Ω 5% 0.062W
3730	4822 051 30472	4.7kΩ 5% 0.062W
3731	4822 051 30271	270Ω 5% 0.062W
3731	4822 051 30331	330Ω 5% 0.062W
3732	4822 051 30102	1kΩ 5% 0.062W
3733	4822 051 30472	4.7kΩ 5% 0.062W
3734	4822 051 30272	2.7kΩ 5% 0.062W
3735	4822 051 30332	3.3kΩ 5% 0.062W
3736	4822 051 30331	330Ω 5% 0.062W
3737	4822 051 30222	2.2kΩ 5% 0.062W
3738	4822 051 30682	6.8kΩ 5% 0.062W
3739	4822 051 30562	5.6kΩ 5% 0.063W 0603
3740	4822 051 30681	680Ω 5% 0.062W
3741	4822 051 30472	4.7kΩ 5% 0.062W
3742	4822 051 30472	4.7kΩ 5% 0.062W
3743	4822 051 30563	56kΩ 5% 0.062W
3744	4822 117 13632	100kΩ 1% 0603 0.62W
3745	4822 051 30562	5.6kΩ 5% 0.063W 0603
3746	4822 051 30562	5.6kΩ 5% 0.063W 0603
3758	4822 051 30103	10kΩ 5% 0.062W
3931	4822 117 12925	47kΩ 1% 0.063W 0603
3932	4822 117 12925	47kΩ 1% 0.063W 0603
3933	4822 117 12925	47kΩ 1% 0.063W 0603
3934	4822 051 30101	100Ω 5% 0.062W

3935	4822 051 30101	100Ω 5% 0.062W
3936	4822 051 30103	10kΩ 5% 0.062W
3937	4822 051 30222	2.2kΩ 5% 0.062W
3938	4822 051 30222	2.2kΩ 5% 0.062W
3939	4822 051 30472	4.7kΩ 5% 0.062W
3940	3198 021 31060	10MΩ 5% 0.062W 0603
3941	3198 021 31060	10MΩ 5% 0.062W 0603
3942	4822 051 30333	33kΩ 5% 0.062W
3943	4822 051 30333	33kΩ 5% 0.062W
3944	4822 051 30333	33kΩ 5% 0.062W
3945	4822 051 30333	33kΩ 5% 0.062W
3946	4822 051 30333	33kΩ 5% 0.062W
3947	4822 051 30333	33kΩ 5% 0.062W
3948	4822 051 30472	4.7kΩ 5% 0.062W
3950	4822 117 13632	100kΩ 1% 0603 0.62W
3951	4822 051 30223	22kΩ 5% 0.062W
3952	4822 051 30153	15kΩ 5% 0.062W
3953	4822 051 30472	4.7kΩ 5% 0.062W
3954	4822 051 30472	4.7kΩ 5% 0.062W
3955	4822 051 30103	10kΩ 5% 0.062W
4001	4822 051 30008	Jumper 0603
4002	4822 051 30008	Jumper 0603
4003	4822 051 30008	Jumper 0603
4304	4822 051 30008	Jumper 0603
4402	4822 051 30008	Jumper 0603
4411	4822 051 30008	Jumper 0603
4412	4822 051 30008	Jumper 0603
4413	4822 051 30008	Jumper 0603
4414	4822 051 30008	Jumper 0603
4415	4822 051 30008	Jumper 0603
4416	4822 051 30008	Jumper 0603
4417	4822 051 30008	Jumper 0603
4418	4822 051 30008	Jumper 0603
4419	4822 051 30008	Jumper 0603
4420	4822 051 30008	Jumper 0603
4421	4822 051 30008	Jumper 0603
4422	4822 051 30008	Jumper 0603
4423	4822 051 30008	Jumper 0603
4424	4822 051 30008	Jumper 0603
4425	4822 051 30008	Jumper 0603
4426	4822 051 30008	Jumper 0603
4428	4822 051 30008	Jumper 0603
4429	4822 051 30008	Jumper 0603
4430	4822 051 30008	Jumper 0603
4431	4822 051 30008	Jumper 0603
4433	4822 051 30008	Jumper 0603
4434	4822 051 30008	Jumper 0603
4435	4822 051 30008	Jumper 0603
4437	4822 051 30008	Jumper 0603
4442	4822 051 30008	Jumper 0603
4443	4822 051 30008	Jumper 0603
4444	4822 051 30008	Jumper 0603
4446	4822 051 30008	Jumper 0603
4447	4822 051 30008	Jumper 0603
4448	4822 051 30008	Jumper 0603
4449	4822 051 30008	Jumper 0603
4452	4822 051 30008	Jumper 0603
4453	4822 051 30008	Jumper 0603
4454	4822 051 30008	Jumper 0603
4455	4822 051 30008	Jumper 0603
4459	4822 051 30008	Jumper 0603
4460	4822 051 10008	Jumper 1206
4461	4822 051 30008	Jumper 0603
4601	4822 051 30008	Jumper 0603
4700	4822 051 30008	Jumper 0603
4701	4822 051 30008	Jumper 0603
4999	4822 051 30008	Jumper 0603

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5001	2422 549 43062	Bead 600Ω at 100MHz
5002	2422 549 43062	Bead 600Ω at 100MHz
5300▲	2422 531 02546	TFM SMT SLOT SRW28EC9-E01V0*
5302▲	2422 549 44509	25MH 0A4 HF2022R
5304	4822 157 70826	2.4µH
5305	4822 157 70826	2.4µH
5306	2422 535 94634	2.2µH LHL08 20%
5307	4822 157 11737	22µH 10%
5308	4822 157 11737	22µH 10%
5309	4822 157 11737	22µH 10%
5401	4822 157 11706	10µH 5%
5402	4822 157 11706	10µH 5%
5403	4822 157 11706	10µH 5%
5404	4822 157 11706	10µH 5%
5405	2422 549 43062	Bead 600Ω at 100MHz
5406	4822 157 11706	10µH 5%
5407	2422 549 43062	Bead 600Ω at 100MHz
5600▲	4822 157 11706	10µH 5%
5601▲	4822 157 11706	10µH 5%
5602▲	4822 157 11706	10µH 5%
5701	2422 549 43062	Bead 600Ω at 100MHz
5702	2422 549 43062	Bead 600Ω at 100MHz
5705	4822 157 11139	6.8µH 5%
5709	4822 157 11139	6.8µH 5%
5710	2422 549 44162	IND VAR 7MM 7KMY 77M8
5711	2422 549 45833	7MM 7KLY 77MHZ8
5713	4822 157 11747	15UH 5%
5714	4822 157 11747	15UH 5%
5931	4822 157 11706	10µH 5%
5932	2422 549 43062	Bead 600Ω at 100MHz

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6003	4822 130 30621	1N4148
6004	4822 130 30621	1N4148
6005	4822 130 11397	BAS316
6300	9322 161 76682	SB340L-7024
6301	4822 130 31603	1N4006
6302	4822 130 31603	1N4006
6303	9322 161 76682	SB340L-7024
6305	4822 130 31603	1N4006
6306	4822 130 31603	1N4006
6307	4822 130 82627	SB540
6307	9322 184 68682	STPS5L40-C2
6308	4822 130 82627	SB540
6308	9322 184 68682	STPS5L40-C2
6309	9322 126 71673	BYT42M
6310	9322 161 78682	SB360L-7024
6311	4822 130 31878	1N4003G
6312	4822 130 11416	PDZ6.8B
6313	4822 130 10871	SBYV27-200
6314	4822 130 10837	UDZS8.2B
6315	4822 130 11397	BAS316
6316	4822 130 30842	BAV21
6317	4822 130 42488	BYD33D
6317	9322 126 71673	BYT42M
6318	4822 130 34142	BZX79-B33
6319	4822 130 42488	BYD33D
6319	9322 126 71673	BYT42M
6320	4822 130 11397	BAS316
6321	4822 130 10654	BAT254
6321	9322 199 12685	DIO SIG SM BAT54WS
6322	4822 130 11416	PDZ6.8B
6324	9340 548 69115	PDZ27B
6325	4822 130 81234	1N5819
6401	9340 548 61115	PDZ12B
6402	9340 548 61115	PDZ12B
6403	9340 548 61115	PDZ12B
6404	9340 548 61115	PDZ12B
6409	4822 130 11416	PDZ6.8B
6414	4822 130 11416	PDZ6.8B
6415	9340 548 61115	PDZ12B
6416	9340 548 61115	PDZ12B
6417	9340 548 61115	PDZ12B
6418	9340 548 61115	PDZ12B
6419	9340 548 61115	PDZ12B
6420	9340 548 61115	PDZ12B
6422	4822 130 11564	UDZ3.9B
6423	9340 548 61115	PDZ12B
6424	9340 548 61115	PDZ12B
6425	9340 548 61115	PDZ12B
6426	9340 548 61115	PDZ12B
6427	9340 548 61115	PDZ12B
6428	4822 130 11522	UDZ15B
6429	4822 130 11522	UDZ15B
6600	4822 130 11397	BAS316
6703	9340 552 30115	BA591
6704	9340 552 30115	BA591
6705	9340 552 30115	BA591

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7001	4822 130 60854	DTA124EU-W
7003	4822 209 62312	MC33078D
7004	9322 148 78668	IC SM AD1852JRS
7005	3198 010 42310	BC847BW
7006	3198 010 42310	BC847BW
7007	9352 670 99118	UDA1361TS/N1
7008	3198 010 42320	BC857BW
7009	3198 010 42320	BC857BW
7010	4822 130 61553	DTC124EU
7301	4822 209 14933	TL431IZ
7302	4822 130 11336	STP16NE06FP
7303	9322 160 70668	SI4936ADY
7303	9322 183 38668	STS9NF30L
7304	4822 209 14933	TL431IZ
7305	4822 209 14933	TL431IZ
7306	4822 130 61553	DTC124EU
7307	9322 157 37687	STP3NC60FP
7308	4822 130 61553	DTC124EU
7309	9322 180 12685	SI2312DS
7310	3198 010 42310	BC847BW
7311	3198 010 42310	BC847BW
7312	4822 130 41782	BF422
7313	9352 673 56112	TEA1507P/N1
7314▲	9322 153 43682	LTV817BM-V
7314▲	9965 000 09548	TCET1108G
7315	4822 209 14933	TL431IZ
7317	9322 191 71687	STD17NF03L-1
7318	9322 163 75685	SI2306DS
7319	5322 130 60159	BC846B
7320	9322 163 75685	SI2306DS
7321	4822 130 61553	DTC124EU
7322	3198 010 42320	BC857BW
7401	3198 010 42320	BC857BW
7402	3198 010 42310	BC847BW
7403	3198 010 42320	BC857BW
7404	3198 010 42320	BC857BW
7405	3198 010 42310	BC847BW
7406	3198 010 42320	BC857BW
7407	3198 010 42310	BC847BW
7408	9322 173 41668	ST6618
7409	3198 010 42310	BC847BW
7410	9322 174 76668	NJM2267M
7411	9322 179 71668	NJM2285M
7412	4822 130 61553	DTC124EU
7415	9340 219 30115	BC817-25W
7416	9340 219 30115	BC817-25W
7421	3198 010 42310	BC847BW
7501	5322 209 11102	HEF4052BT
7502	4822 209 32071	MC33079D
7503	5322 209 11102	HEF4052BT
7504	5322 209 11102	HEF4052BT
7505	4822 209 62312	MC33078D
7506	9340 219 30115	BC817-25W
7508	9340 219 30115	BC817-25W
7509	9340 219 30115	BC817-25W
7511	9340 219 30115	BC817-25W
7600	9322 186 87668	MSP3415G-QG-B8V3
7701	4822 130 61553	DTC124EU
7702	4822 130 61553	DTC124EU
7704	4822 130 61553	DTC124EU
7705	4822 130 61553	DTC124EU
7706	4822 130 61553	DTC124EU
7710	9352 606 11118	TDA9818T/V1
7710	9352 621 13118	IC SM TDA9817T/V1(PHSE)
7711	3198 010 42320	BC857BW
7712	4822 130 61553	DTC124EU
7713	3198 010 42320	BC857BW
7714	3198 010 42310	BC847BW
7716	3198 010 42320	BC857BW
7717	3198 010 42310	BC847BW
7931	4822 209 17505	STV5348D
7932	3198 010 42310	BC847BW
7933	3198 010 42310	BC847BW
7934	4822 209 60177	LM339D

Up Sub Board

Various

1801	2422 543 01115	24.576MHz 12P QS06
1801	2422 543 01368	24M576 12P CX8045
1805	4822 242 70938	TA252E00 (32,768KHZ)
1901	2422 025 12488	CON BM H 2P M 2.50 EH B
1902	2422 025 12488	CON BM H 2P M 2.50 EH B
1980	2422 025 17723	CON BM V 8P M
1980	2422 025 18217	CON V 8P M 2.00
1984	2422 025 17723	CON BM V 8P M
1984	2422 025 18217	CON V 8P M 2.00
1986	2422 025 16677	Connector 10P
1987	2422 025 17723	CON BM V 8P M
1987	2422 025 18217	CON V 8P M 2.00
1988	2422 025 17723	CON BM V 8P M
1988	2422 025 18217	CON V 8P M 2.00

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2800	2238 586 59812	100nF 20-80% 50V 0603
2801	4822 122 33752	15pF 5% 50V
2802	4822 122 33752	15pF 5% 50V
2803	2238 586 59812	100nF 20-80% 50V 0603
2804	2238 586 59812	100nF 20-80% 50V 0603
2805	2238 586 59812	100nF 20-80% 50V 0603
2806	2238 586 59812	100nF 20-80% 50V 0603
2807	4822 126 13879	220nF 20% 16V
2808	2238 586 59812	100nF 20-80% 50V 0603
2809	2238 586 59812	100nF 20-80% 50V 0603
2810	4822 122 33741	10pF 10% 50V
2811	4822 122 33741	10pF 10% 50V
2812	5322 126 11583	10nF 10% 50V 0603
2813	4822 122 33741	10pF 10% 50V
2814	4822 122 33741	10pF 10% 50V
2815	4822 126 13883	220pF 5% 50V
2816	4822 124 11968	220mF +80-20% 5,5V

2817	2238 586 59812	100nF 20-80% 50V 0603
2818	4822 126 13883	220pF 5% 50V
2819	4822 124 42234	100µF 20% 6,3V
2820	5322 126 11583	10nF 10% 50V 0603
2821	5322 126 11583	10nF 10% 50V 0603
2822	2238 586 59812	100nF 20-80% 50V 0603
2823	5322 126 11578	1nF 10% 50V 0603
2824	3198 017 41050	1µF 10V 0603
2825	2020 552 94427	100pF 5% 50v 0603
2828	2238 586 59812	100nF 20-80% 50V 0603
2829	4822 124 21732	10µF 20% 25V
2830	2238 586 59812	100nF 20-80% 50V 0603
2831	5322 126 11583	10nF 10% 50V 0603
2833	2238 586 59812	100nF 20-80% 50V 0603
2912	4822 124 23052	100UF20% 16V
2913	4822 124 23052	100UF20% 16V

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3800	4822 051 30101	100Ω 5% 0.062W
3801	4822 051 30103	10kΩ 5% 0.062W
3802	4822 051 30101	100Ω 5% 0.062W
3803	4822 051 30102	1kΩ 5% 0.062W
3804	4822 051 30103	10kΩ 5% 0.062W
3805	4822 051 30101	100Ω 5% 0.062W
3806	4822 051 30223	22kΩ 5% 0.062W
3807	4822 117 13632	100kΩ 1% 0603 0.62W
3808	4822 117 13632	100kΩ 1% 0603 0.62W
3809	4822 117 13632	100kΩ 1% 0603 0.62W
3810	4822 117 13632	100kΩ 1% 0603 0.62W
3811	4822 051 30101	100Ω 5% 0.062W
3812	4822 051 30223	22kΩ 5% 0.062W
3813	4822 051 30103	10kΩ 5% 0.062W
3814	4822 051 30103	10kΩ 5% 0.062W
3815	4822 051 30183	18kΩ 5% 0.062W
3816	4822 051 30103	10kΩ 5% 0.062W
3817	4822 051 30222	2.2kΩ 5% 0.062W
3818	4822 051 30472	4.7kΩ 5% 0.062W
3819	4822 051 30103	10kΩ 5% 0.062W
3820	4822 051 30102	1kΩ 5% 0.062W
3821	4822 051 30103	10kΩ 5% 0.062W
3822	4822 051 30103	10kΩ 5% 0.062W
3823	4822 117 13632	100kΩ 1% 0603 0.62W
3824	4822 051 30102	1kΩ 5% 0.062W
3825	4822 051 30103	10kΩ 5% 0.062W
3826	4822 051 30102	1kΩ 5% 0.062W
3827	4822 051 30102	1kΩ 5% 0.062W
3828	4822 051 30103	10kΩ 5% 0.062W
3829	4822 051 30103	10kΩ 5% 0.062W
3830	4822 051 30102	1kΩ 5% 0.062W
3831	4822 051 30102	1kΩ 5% 0.062W
3832	4822 051 30333	33kΩ 5% 0.062W
3833	4822 051 30102	1kΩ 5% 0.062W
3834	4822 051 30102	1kΩ 5% 0.062W
3835	4822 051 30102	1kΩ 5% 0.062W
3836	4822 051 30101	100Ω 5% 0.062W
3837	4822 051 30123	12kΩ 5% 0.062W
3838	4822 051 30102	1kΩ 5% 0.062W
3839	4822 051 30273	27kΩ 5% 0.062W
3840	4822 051 30472	4.7kΩ 5% 0.062W
3841	4822 117 13632	100kΩ 1% 0603 0.62W
3842	4822 117 12891	220kΩ 1% 0.063W 0603
3843	4822 051 30333	33kΩ 5% 0.062W
3844	4822 051 30221	220Ω 5% 0.062W
3845	4822 051 30102	1kΩ 5% 0.062W
3846	4822 051 30333	33kΩ 5% 0.062W
3847	4822 051 30103	10kΩ 5% 0.062W
3849	4822 117 12925	47kΩ 1% 0.063W 0603
3850	4822 051 30183	18kΩ 5% 0.062W
3851	4822 051 30103	10kΩ 5% 0.062W
3852	4822 051 30103	10kΩ 5% 0.062W
3854	4822 051 30102	1kΩ 5% 0.062W
3855	4822 051 30471	470Ω 5% 0.062W
3856	4822 051 30103	10kΩ 5% 0.062W
3857	4822 051 30103	10kΩ 5% 0.062W
3858	4822 117 13632	100kΩ 1% 0603 0.62W
3860	4822 051 30222	2.2kΩ 5% 0.062W
3861	3198 021 32250	2.2MΩ 5% 0603
3862	4822 051 30103	10kΩ 5% 0.062W
3863	4822 117 13608	4.7Ω 5% 0603 0.62W
3864	4822 117 13608	4.7Ω 5% 0603 0.62W
3865	4822 117 13608	4.7Ω 5% 0603 0.62W
3866	4822 117 13608	4.7Ω 5% 0603 0.62W
3867	4822 051 30759	75Ω 5% 0.062W
3868	4822 051 30103	10kΩ 5% 0.062W
3869	4822 051 30331	330Ω 5% 0.062W
3870	4822 117 13632	100kΩ 1% 0603 0.62W
3871	4822 051 30103	10kΩ 5% 0.062W
3872	4822 051 30103	10kΩ 5% 0.062W
3873	4822 051 30472	4.7kΩ 5% 0.062W
3874	4822 051 30103	10kΩ 5% 0.062W
3875	4822 051 30103	10kΩ 5% 0.062W
3876	4822 051 30103	10kΩ 5% 0.062W
3878	4822 051 30102	1kΩ 5% 0.062W
3879	4822 051 30102	1kΩ 5% 0.062W
3881	4822 117 12925	47kΩ 1% 0.063W 0603
3882	4822 117 12925	47kΩ 1% 0.063W 0603
3884	4822 051 30101	100Ω 5% 0.062W
3885	4822 051 30101	100Ω 5% 0.062W
3886	4822 051 30472	4.7kΩ 5% 0.062W
3887	4822 051 30472	4.7kΩ 5% 0.062W
3888	4822 051 30471	470Ω 5% 0.062W
3889	4822 051 30183	18kΩ 5% 0.062W
3913	4822 051 30102	1kΩ 5% 0.062W
3914	4822 051 30102	1kΩ 5% 0.062W
3915	4822 051 30102	1kΩ 5% 0.062W
3916	4822 051 30273	27kΩ 5% 0.062W
3917	2322 704 63603	36kΩ 0603 RC22H 1%
3918	2322 704 69101	910Ω 1% 0.063W 0603
3918	4822 051 30102	1kΩ 5% 0.062W
3919	2120 108 93058	33kΩ 1% 0603
3920	4822 051 30562	5.6kΩ 5% 0.063W 0603
3922	4822 051 30102	1kΩ 5% 0.062W
3923	4822 051 30103	10kΩ 5% 0.062W
3924	4822 051 30103	10kΩ 5% 0.062W
3925	4822 117 12706	10kΩ 1% 0.063W 0603
3926	4822 051 30472	4.7kΩ 5% 0.062W
3927	4822 051 30333	33kΩ 5% 0.062W
3929	4822 051 30008	Jumper 0603
3931	4822 051 30008	Jumper 0603
3933	4822 051 30008	Jumper 0603
4904	4822 051 10008	Jumper 1206

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5801	2422 549 44607	Bead 600Ω at 100MHz
5802	2422 549 44607	Bead 600Ω at 100MHz
5803	2422 549 44607	Bead 600Ω at 100MHz
5804	2422 549 44607	Bead 600Ω at 100MHz

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6800	4822 130 11397	BAS316
6801	4822 130 11564	UDZ3.9B
6802	4822 130 10654	BAT254
6803	4822 130 10654	BAT254
6804	4822 130 10654	BAT254
6805	4822 130 10654	BAT254
6902	4822 130 10654	BAT254
6903	5322 130 34331	BAV70

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7801	9352 190 00118	74LVC573AD
7802	4822 130 61553	DTC124EU
7803	9322 186 16668	CY62128VLL-70SC
7804	3103 165 13721	TMP91CW12AF/LIRP1
7805	9965 000 23508	M29W800DT-70N6/ AB140017
7806	9322 163 26685	NCP301LSN30
7807	4822 209 73852	PMBT2369
7808	4822 209 16907	M24C16-MN6T
7810	9352 686 35118	PCA9515DP
7811	4822 130 61553	DTC124EU
7813	3198 010 42310	BC847BW
7814	3198 010 42310	BC847BW
7815	3198 010 42310	BC847BW
7816	3198 010 42310	BC847BW
7817	3198 010 42310	BC847BW
7818	4822 130 60854	DTA124EU-W
7821	9340 560 36235	BSH111
7822	9340 560 36235	BSH111
7825	9322 181 92682	LA7213
7902	4822 209 63709	LM324D
7904	4822 130 60854	DTA124EU-W
7905	4822 130 61553	DTC124EU
7906	4822 130 61553	DTC124EU
7907	4822 130 61553	DTC124EU
7908	4822 130 61553	DTC124EU
7909	4822 130 41087	BC638
7910	4822 130 61553	DTC124EU

Power Supply Interface Board

Various

1350▲	2422 132 07467	Relay 1p 12V 5A LKS1AF
1936	2422 025 00531	CON 7P M
1937▲	4822 265 20723	Connector 2p m
1938	2422 025 12488	CON BM H 2P M 2.50 EH B
1939	2422 025 09405	CON 2P M

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3380▲	4822 053 21684	680kΩ 5% 0,5W

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6350	4822 130 30842	BAV21

In / Out Extension Board

Various

1920	2422 025 17897	CON H 6P F
1921	2422 025 16924	CON H 7P
1922	2422 026 05374	SOC CINCH H 3P F 3L1
1923	2422 025 16979	CON BM H 4P F
1924	2422 026 05391	SOC PHONE 1P F 3.5
1925	4822 267 31729	CONNECTOR

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2250	3198 017 41050	1µF 10V 0603
2254	3198 016 31510	150pF 10% 50V 0603
2255	2238 586 59812	100nF 20-80% 50V 0603
2256	2238 586 59812	100nF 20-80% 50V 0603
2257	5322 126 11578	1nF 10% 50V 0603
2258	2238 586 59812	100nF 20-80% 50V 0603
2259	2222 867 15339	33pF 5% 50V 0603
2260	2238 586 59812	100nF 20-80% 50V 0603
2261	4822 124 42234	100µF 20% 6,3V
2265	5322 126 11583	10nF 10% 50V 0603
2266	2238 586 59812	100nF 20-80% 50V 0603
2267	5322 126 11578	1nF 10% 50V 0603

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3250	4822 116 52219	330Ω 5% 0.5W
3252	4822 051 30101	100Ω 5% 0.062W
3254	4822 051 30221	220Ω 5% 0.062W
3255	4822 117 13632	100kΩ 1% 0603 0.62W
3257	4822 051 30221	220Ω 5% 0.062W
3259	4822 116 52201	75Ω 5% 0.5W
3260	4822 051 30222	2.2kΩ 5% 0.062W
3261	4822 051 30471	470Ω 5% 0.062W
3262	4822 051 30561	560Ω 5% 0.062W
3263	4822 116 52195	47Ω 5% 0.5W
3264	4822 051 30101	100Ω 5% 0.062W
3273	2122 551 00031	VDR 0805 1mA/6V4 21V
3273	2322 574 10402	VDR 0805 1mA/6V4 21V
4001	4822 051 30008	Jumper 0603
4201	4822 051 30008	Jumper 0603

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5250	2422 536 00019	TRANSFORMER 6RG
5251	2422 549 43062	Bead 600Ω at 100MHz
5253	2422 549 43062	Bead 600Ω at 100MHz
5255	2422 549 43062	Bead 600Ω at 100MHz

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6255	9322 175 41687	SOC OPT JFJ1000-010010
6256	9322 146 61685	DF3A6.8FU
6257	9322 146 61685	DF3A6.8FU
6258	9322 146 61685	DF3A6.8FU

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7250	5322 209 11517	PC74HCU04T

Digital Board

Various

1001	2422 543 01422	SM 24M576 18P CX8045
1001	2422 543 89017	24M576 18P CX-11F
1101	2422 025 17728	CON 40P M
1102	2422 025 18185	CON V 40P M 2.54
1103	2422 025 17104	Connector 7p m
1104	2422 025 16729	Connector FFC 10p m
1201	2422 543 01115	24.576MHz 12P QS06
1201	2422 543 01368	24M576 12P CX8045
1203	2422 025 17955	CON V 6P M
1400	2422 025 18219	CON 28P M
1500	2422 025 17441	CON BM V 12P M
1505▲	2422 086 11087	FUSE F 1A 125V

1506▲	2422 086 11087	FUSE F 1A 125V
1507▲	2422 086 11087	FUSE F 1A 125V
1704	2422 025 16794	CON BM V 7P F
1900	2422 025 16389	CON V 22P F
1901	2422 025 16987	CON V 6P F
1904	2422 025 16389	CON V 22P F

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2014	4822 124 80151	47µF 20% 16V
2015	2238 586 59812	100nF 20-80% 50V 0603
2016	2238 586 59812	100nF 20-80% 50V 0603
2017	2238 586 59812	100nF 20-80% 50V 0603
2018	2238 586 59812	100nF 20-80% 50V 0603
2019	2238 586 59812	100nF 20-80% 50V 0603
2020	2238 586 59812	100nF 20-80% 50V 0603
2021	2238 586 59812	100nF 20-80% 50V 0603
2022	2020 021 91729	4.7µF 20% 35V
2026	2238 586 59812	100nF 20-80% 50V 0603
2027	2238 586 59812	100nF 20-80% 50V 0603
2028	2238 586 59812	100nF 20-80% 50V 0603
2029	2238 586 59812	100nF 20-80% 50V 0603
2030	2238 586 59812	100nF 20-80% 50V 0603
2031	2238 586 59812	100nF 20-80% 50V 0603
2032	2238 586 59812	100nF 20-80% 50V 0603
2033	2020 021 91729	4.7µF 20% 35V
2035	2238 586 59812	100nF 20-80% 50V 0603
2036	4822 126 14506	270pF 5% 50V 0603
2037	2238 586 59812	100nF 20-80% 50V 0603
2038	2238 586 59812	100nF 20-80% 50V 0603
2039	2238 586 59812	100nF 20-80% 50V 0603
2040	2238 586 59812	100nF 20-80% 50V 0603
2041	2238 586 59812	100nF 20-80% 50V 0603
2042	2238 586 59812	100nF 20-80% 50V 0603
2043	2238 586 59812	100nF 20-80% 50V 0603
2044	2020 021 91729	4.7µF 20% 35V
2048	3198 016 31510	150pF 10% 50V 0603
2049	2020 021 91729	4.7µF 20% 35V
2050	2238 586 59812	100nF 20-80% 50V 0603
2052	2238 586 59812	100nF 20-80% 50V 0603
2053	2238 586 59812	100nF 20-80% 50V 0603
2054	2238 586 59812	100nF 20-80% 50V 0603
2056	2238 586 59812	100nF 20-80% 50V 0603
2058	2238 586 59812	100nF 20-80% 50V 0603
2059	2222 867 15339	33pF 5% 50V 0603
2060	2222 867 15339	33pF 5% 50V 0603
2061	2238 586 59812	100nF 20-80% 50V 0603
2063	2238 586 59812	100nF 20-80% 50V 0603
2064	2238 586 59812	100nF 20-80% 50V 0603
2065	2238 586 59812	100nF 20-80% 50V 0603
2066	3198 016 31020	1nF 10% 25V 0603
2067	2238 586 59812	100nF 20-80% 50V 0603
2068	2238 586 59812	100nF 20-80% 50V 0603
2069	2020 021 91729	4.7µF 20% 35V
2070	2020 021 91729	4.7µF 20% 35V
2071	2238 586 59812	100nF 20-80% 50V 0603
2073	2238 586 59812	100nF 20-80% 50V 0603
2101	2238 916 15641	22nF 10% 25V 0603
2103	2238 586 59812	100nF 20-80% 50V 0603
2108	2238 586 59812	100nF 20-80% 50V 0603
2112	4822 126 14247	1.5nF 50V 0603
2114	4822 126 13881	470pF 5% 50V
2116	2238 586 59812	100nF 20-80% 50V 0603
2119	4822 126 14247	1.5nF 50V 0603
2120	2238 586 59812	100nF 20-80% 50V 0603
2125	2238 586 59812	100nF 20-80% 50V 0603
2200	3198 017 41050	1µF 10V 0603
2201	4822 126 14506	270pF 5% 50V 0603
2202	4822 126 11663	12pF 5% 50V 0603
2203	4822 126 11663	12pF 5% 50V 0603
2206	2238 586 59812	100nF 20-80% 50V 0603
2207	2238 586 59812	100nF 20-80% 50V 0603
2208	2020 021 91729	4.7µF 20% 35V
2209	2238 586 59812	100nF 20-80% 50V 0603
2210	2238 586 59812	100nF 20-80% 50V 0603
2212	4822 124 12095	100µF 20% 16V
2214	2238 586 59812	100nF 20-80% 50V 0603
2215	2238 586 59812	100nF 20-80% 50V 0603
2217	2238 586 59812	100nF 20-80% 50V 0603
2218	2238 586 59812	100nF 20-80% 50V 0603
2219	2238 586 59812	100nF 20-80% 50V 0603
2220	2238 586 59812	100nF 20-80% 50V 0603
2221	2238 586 59812	100nF 20-80% 50V 0603
2222	2238 586 59812	100nF 20-80% 50V 0603
2223	2238 586 59812	100nF 20-80% 50V 0603
2224	2238 586 59812	100nF 20-80% 50V 0603
2225	2238 586 59812	100nF 20-80% 50V 0603
2226	2238 586 59812	100nF 20-80% 50V 0603
2227	2238 586 59812	100nF 20-80% 50V 0603
2228	2238 586 59812	100nF 20-80% 50V 0603
2229	2238 586 59812	100nF 20-80% 50V 0603
2230	2238 586 59812	100nF 20-80% 50V 0603
2231	2238 586 59812	100nF 20-80% 50V 0603
2232	2238 586 59812	100nF 20-80% 50V 0603
2233	2238 586 59812	100nF 20-80% 50V 0603
2234	2238 586 59812	100nF 20-80% 50V 0603
2235	3198 016 31020	1nF 10% 25V 0603
2236	2238 586 59812	100nF 20-80% 50V 0603
2237	2238 586 59812	100nF 20-80% 50V 0603
2308	2238 586 59812	100nF 20-80% 50V 0603
2310	2238 586 59812	100nF 20-80% 50V 0603
2320	2238 586 59812	100nF 20-80% 50V 0603
2321	2238 586 59812	100nF 20-80% 50V 0603
2322	2238 586 59812	100nF 20-80% 50V 0603
2323	2238 586 59812	100nF 20-80% 50V 0603
2403	2238 586 59812	100nF 20-80% 50V 0603
2404	4822 124 23002	10µF 20% 16V
2405	2238 586 59812	100nF 20-80% 50V 0603
2406	2238 586 59812	100nF 20-80% 50V 0603
2407	2238 586 59812	100nF 20-80% 50V 0603
2408	4822 124 23002	10µF 20% 16V
2409	2238 586 59812	100nF 20-80% 50V 0603
2410	2238 586 59812	100nF 20-80% 50V 0603
2411	2238 586 59812	100nF 20-80% 50V 0603
2412	2238 586 59812	100nF 20-80% 50V 0603
2413	2238 586 59812	100nF 20-80% 50V 0603
2414	2238 586 59812	100nF 20-80% 50V 0603
2415	2238 586 59812	100nF 20-80% 50V 0603
2416	2238 586 59812	100nF 20-80% 50V 0603
2417	2238 586 59812	100nF 20-80% 50V 0603
2418	4822 124 23002	10µF 20% 16V
2419	2238 586 59812	100nF 20-80% 50V 0603
2420	4822 124 23002	10µF 20% 16V
2421	2238 586 59812	100nF 20-80% 50V 0603
2422	2238 586 59812	100nF 20-80% 50V 0603
2423	2238 586 59812	100nF 20-80% 50V 0603
2424	2238 586 59812	100nF 20-80% 50V 0603
2425	2238 586 59812	100nF 20-80% 50V 0603
2426	2238 586 59812	100nF 20-80% 50V 0603
2427	2238 586 59812	100nF 20-80% 50V 0603
2428	2238 586 59812	100nF 20-80% 50V 0603
2429	2238 586 59812	100nF 20-80% 50V 0603
2432	2238 586 59812	100nF 20-80% 50V 0603
2433	2238 586 59812	100nF 20-80% 50V 0603
2434	4822 126 11785	47pF 5% 50V 0603
2512	2020 021 91857	100µF 6V3 20%
2512	4822 124 11618	NEA70JM-107X (100UF 6.3V)
2514	2238 586 59812	100nF 20-80% 50V 0603
2515	3198 017 44740	470nF 10V 0603
2516	2020 021 91857	100µF 6V3 20%
2516	4822 124 11618	NEA70JM-107X (100UF 6.3V)
2518	2020 552 94427	100pF 5% 50v 0603
2519	2238 586 59812	100nF 20-80% 50V 0603
2521	2238 586 59812	100nF 20-80% 50V 0603
2524	2238 586 59812	100nF 20-80% 50V 0603
2525	2238 586 59812	100nF 20-80% 50V 0603
2526	2238 586 59812	100nF 20-80% 50V 0603
2527	5322 126 11583	10nF 10% 50V 0603
2701	2238 586 59812	100nF 20-80% 50V 0603
2712	2238 586 59812	100nF 20-80% 50V 0603
2806	2238 586 59812	100nF 20-80% 50V 0603
2807	2238 586 59812	100nF 20-80% 50V 0603
2808	2238 586 59812	100nF 20-80% 50V 0603
2809	2238 586 59812	100nF 20-80% 50V 0603
2810	2238 586 59812	100nF 20-80% 50V 0603
2811	2238 586 59812	100nF 20-80% 50V 0603
2812	2238 586 59812	100nF 20-80% 50V 0603
2820	2238 586 59812	100nF 20-80% 50V 0603
2821	2238 586 59812	100nF 20-80% 50V 0603
2822	2238 586 59812	100nF 20-80% 50V 0603
2823	2238 586 59812	100nF 20-80% 50V 0603
2824	2238 586 59812	100nF 20-80% 50V 0603
2825	2238 586 59812	100nF 20-80% 50V 0603
2826	2238 586 59812	100nF 20-80% 50V 0603
2830	2238 586 59812	100nF 20-80% 50V 0603
2832	2238 586 59812	100nF 20-80% 50V 0603
2833	2238 586 59812	100nF 20-80% 50V 0603
2834	2238 586 59812	100nF 20-80% 50V 0603
2836	2238 586 59812	100nF 20-80% 50V 0603
2900	2238 586 59812	100nF 20-80% 50V 0603
2901	2238 586 59812	100nF 20-80% 50V 0603
2902	2238 586 59812	100nF 20-80% 50V 0603
2903	2238 586 59812	100nF 20-80% 50V 0603
2904	2238 586 59812	100nF 20-80% 50V 0603
2905	2238 586 59812	100nF 20-80% 50V 0603
2906	2238 586 59812	100nF 20-80% 50V 0603
2907	2238 586 59812	100nF 20-80% 50V 0603
2908	2238 586 59812	100nF 20-80% 50V 0603
2909	2238 586 59812	100nF 20-80% 50V 0603
2910	2238 586 59812	100nF 20-80% 50V 0603
2911	3198 017 42230	22nF 50V
2912	2238 586 59812	100nF 20-80% 50V 0603
2913	2238 586 59812	100nF 20-80% 50V 0603
2914	4822 126 14506	270pF 5% 50V 0603
2915	4822 126 14506	270pF 5% 50V 0603
2916	4822 126 14506	270pF 5% 50V 0603
2917	4822 126 14506	270pF 5% 50V 0603
2918	4822 122 33761	22pF 5% 50V
2919	4822 122 33761	22pF 5% 50V
2920	4822 122 33761	22pF 5% 50V
2921	4822 122 33761	22pF 5% 50V
2922	4822 122 33761	22pF 5% 50V
2923	2238 586 59812	100nF 20-80% 50V 0603
2924	2238 586 59812	100nF 20-80% 50V 0603
2925	2238 586 59812	100nF 20-80% 50V 0603
2926	4822 126 14506	270pF 5% 50V 0603
2927	4822 126 14506	270pF 5% 50V 0603
2928	4822 126 14506	270pF 5% 50V 0603
2929	4822 126 14506	270pF 5% 50V 0603
2930	2238 586 59812	100nF 20-80% 50V 0603
2931	2020 021 91729	4.7µF 20% 35V
2932	4822 122 33761	22pF 5% 50V
2933	2238 586 59812	100nF 20-80% 50V 0603
2934	2238 586 59812	100nF 20-80% 50V 0603
2935	4822 126 14506	270pF 5% 50V 0603
2936	4822 126 14506	270pF 5% 50V 0603
2937	4822 126 14506	270pF 5% 50V 0603
2938	2238 586 59812	100nF 20-80% 50V 0603
2939	2020 021 91729	4.7µF 20% 35V
2940	2238 586 59812	100nF 20-80% 50V 0603

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3000	4822 051 30681	680Ω 5% 0.062W
3003	4822 051 30101	100Ω 5% 0.062W
3004	4822 051 30681	680Ω 5% 0.062W
3005	4822 051 30101	100Ω 5% 0.062W
3006	4822 051 30222	2.2kΩ 5% 0.062W
3008	4822 051 30101	100Ω 5% 0.062W
3009	4822 051 30102	1kΩ 5% 0.062W
3010	4822 117 12139	22Ω 5% 0.062W
3011	4822 051 30103	10kΩ 5% 0.062W
3012	4822 051 30472	4.7kΩ 5% 0.062W
3013	4822 117 12917	1Ω 5% 0.062W 0603
3015	4822 051 30103	10kΩ 5% 0.062W
3016	4822 051 30103	10kΩ 5% 0.062W
3017	4822 051 30103	10kΩ 5% 0.062W
3018	4822 051 30103	10kΩ 5% 0.062W
3019	4822 051 30472	4.7kΩ 5% 0.062W
3021	4822 051 30101	100Ω 5% 0.062W
3022	4822 051 30472	4.7kΩ 5% 0.062W
3032	4822 051 30101	100Ω 5% 0.062W
3033	4822 051 30101	100Ω 5% 0.062W
3034	4822 051 30101	100Ω 5% 0.062W
3082	4822 117 13632	100kΩ 1% 0603 0.62W
3087	4822 051 30479	47Ω 5% 0.062W
3088	4822 117 13632	100kΩ 1% 0603 0.62W
3090	4822 051 30472	4.7kΩ 5% 0.062W
3092	4822 117 13632	100kΩ 1% 0603 0.62W
3093	4822 051 30682	6.8kΩ 5% 0.062W
3095	4822 051 30472	4.7kΩ 5% 0.062W
3096	4822 051 30472	4.7kΩ 5% 0.062W
3098	4822 117 13632	100kΩ 1% 0603 0.62W
3100	4822 051 30103	10kΩ 5% 0.062W
3101	4822 051 30339	33Ω 5% 0.062W
3103	4822 051 30339	33Ω 5% 0.062W
3106	4822 051 30339	33Ω 5% 0.062W
3108	4822 051 30339	33Ω 5% 0.062W
3110	4822 051 30339	33Ω 5% 0.062W
3112	4822 051 30339	33Ω 5% 0.062W
3113	4822 051 30103	10kΩ 5% 0.062W
3114	4822 051 30472	4.7kΩ 5% 0.062W
3116	4822 051 30339	33Ω 5% 0.062W
3117	4822 051 30472	4.7kΩ 5% 0.062W
3118	4822 051 30339	33Ω 5% 0.062W
3119	4822 051 30472	4.7kΩ 5% 0.062W
3120	4822 051 30339	33Ω 5% 0.062W
3121	4822 051 30103	10kΩ 5% 0.062W
3122	4822 051 30339	33Ω 5% 0.062W
3124	4822 051 30339	33Ω 5% 0.062W
3126	4822 051 30339	33Ω 5% 0.062W
3128	4822 051 30339	33Ω 5% 0.062W
3130	4822 051 30339	33Ω 5% 0.062W
3133	4822 051 30339	33Ω 5% 0.062W
3135	4822 051 30339	33Ω 5% 0.062W
3137	4822 051 30101	100Ω 5% 0.062W
3138	4822 051 30339	33Ω 5% 0.062W
3142	4822 051 30101	100Ω 5% 0.062W
3143	2322 702 60829	82Ω 5% 0603
3144	4822 051 30101	100Ω 5% 0.062W
3145	4822 051 30562	5.6kΩ 5% 0.063W 0603
3147	4822 117 12139	22Ω 5% 0.062W
3149	4822 117 12139	22Ω 5% 0.062W
3154	2322 702 60829	82Ω 5% 0603
3156	4822 051 30102	1kΩ 5% 0.062W
3159	4822 117 12139	22Ω 5% 0.062W
3161	2322 702 60829	82Ω 5% 0603
3162	4822 051 30472	4.7kΩ 5% 0.062W

3164	4822 051 30103	10kΩ 5% 0.062W
3167	4822 051 30339	33Ω 5% 0.062W
3168	4822 051 30472	4.7kΩ 5% 0.062W
3170	4822 051 30339	33Ω 5% 0.062W
3172	4822 051 30339	33Ω 5% 0.062W
3173	4822 051 30472	4.7kΩ 5% 0.062W
3175	4822 051 30339	33Ω 5% 0.062W
3178	4822 051 30339	33Ω 5% 0.062W
3184	4822 051 30472	4.7kΩ 5% 0.062W
3185	4822 051 30101	100Ω 5% 0.062W
3186	4822 051 30103	10kΩ 5% 0.062W
3187	4822 051 30472	4.7kΩ 5% 0.062W
3189	4822 051 30103	10kΩ 5% 0.062W
3191	4822 117 13632	100kΩ 1% 0603 0.62W
3192	4822 051 30682	6.8kΩ 5% 0.062W
3195	4822 117 13632	100kΩ 1% 0603 0.62W
3197	4822 051 30101	100Ω 5% 0.062W
3199	4822 051 30103	10kΩ 5% 0.062W
3200	4822 051 30103	10kΩ 5% 0.062W
3202	4822 051 30101	100Ω 5% 0.062W
3204	4822 051 30103	10kΩ 5% 0.062W
3205	2322 704 66342	6.34kΩ 0603 RC22H 1%
3210	4822 051 30339	33Ω 5% 0.062W
3211	4822 051 30339	33Ω 5% 0.062W
3212	2322 734 65609	56Ω 1% 0.125W 0805
3213	2322 734 65609	56Ω 1% 0.125W 0805
3214	4822 051 30339	33Ω 5% 0.062W
3215	4822 051 30339	33Ω 5% 0.062W
3216	4822 051 30109	10Ω 5% 0.062W
3217	4822 051 30339	33Ω 5% 0.062W
3218	4822 051 30339	33Ω 5% 0.062W
3219	4822 051 30103	10kΩ 5% 0.062W
3220	4822 051 30109	10Ω 5% 0.062W
3221	4822 051 30339	33Ω 5% 0.062W
3222	4822 051 30339	33Ω 5% 0.062W
3223	4822 051 30109	10Ω 5% 0.062W
3224	2322 702 60829	82Ω 5% 0603
3225	4822 051 30109	10Ω 5% 0.062W
3226	4822 051 30339	33Ω 5% 0.062W
3227	4822 051 30339	33Ω 5% 0.062W
3228	4822 051 30109	10Ω 5% 0.062W
3229	4822 051 30339	33Ω 5% 0.062W
3230	4822 051 30103	10kΩ 5% 0.062W
3231	4822 051 30109	10Ω 5% 0.062W
3232	2322 734 65609	56Ω 1% 0.125W 0805
3233	2322 734 65609	56Ω 1% 0.125W 0805
3234	4822 051 30109	10Ω 5% 0.062W
3235	4822 051 30103	10kΩ 5% 0.062W
3236	4822 051 30109	10Ω 5% 0.062W
3237	4822 051 30339	33Ω 5% 0.062W
3238	4822 051 30109	10Ω 5% 0.062W
3239	4822 051 30339	33Ω 5% 0.062W
3240	2322 704 65102	5.1kΩ 1% 0603
3241	4822 051 30339	33Ω 5% 0.062W
3242	4822 051 30109	10Ω 5% 0.062W
3243	4822 051 30339	33Ω 5% 0.062W
3244	4822 051 30339	33Ω 5% 0.062W
3245	4822 051 30109	10Ω 5% 0.062W
3246	4822 051 30339	33Ω 5% 0.062W
3247	4822 051 30339	33Ω 5% 0.062W
3248	4822 051 30109	10Ω 5% 0.062W
3249	4822 051 30339	33Ω 5% 0.062W
3250	4822 051 30472	4.7kΩ 5% 0.062W
3251	4822 051 30339	33Ω 5% 0.062W
3252	4822 051 30339	33Ω 5% 0.062W
3253	4822 117 12917	1Ω 5% 0.062W 0603
3254	4822 051 30339	33Ω 5% 0.062W
3255	4822 051 30472	4.7kΩ 5% 0.062W
3256	4822 051 30472	4.7kΩ 5% 0.062W
3257	4822 051 30223	22kΩ 5% 0.062W
3258	4822 051 30223	22kΩ 5% 0.062W
3259	4822 051 30472	4.7kΩ 5% 0.062W
3260	4822 051 30101	100Ω 5% 0.062W
3261	4822 117 12917	1Ω 5% 0.062W 0603
3262	4822 051 30472	4.7kΩ 5% 0.062W
3263	4822 051 30472	4.7kΩ 5% 0.062W
3264	4822 051 30472	4.7kΩ 5% 0.062W
3265	4822 051 30472	4.7kΩ 5% 0.062W
3266	4822 051 30472	4.7kΩ 5% 0.062W
3267	4822 051 30472	4.7kΩ 5% 0.062W
3268	4822 051 30472	4.7kΩ 5% 0.062W
3269	4822 051 30472	4.7kΩ 5% 0.062W
3270	4822 051 30101	100Ω 5% 0.062W
3271	4822 051 30101	100Ω 5% 0.062W
3272	4822 051 30101	100Ω 5% 0.062W
3273	4822 051 30109	10Ω 5% 0.062W
3274	4822 051 30101	100Ω 5% 0.062W
3276	4822 051 30102	1kΩ 5% 0.062W
3277	4822 051 30101	100Ω 5% 0.062W
3278	4822 051 30101	100Ω 5% 0.062W
3279	4822 051 30101	100Ω 5% 0.062W
3280	4822 051 30103	10kΩ 5% 0.062W
3281	4822 051 30103	10kΩ 5% 0.062W
3282	4822 051 30103	10kΩ 5% 0.062W
3285	4822 051 30109	10Ω 5% 0.062W
3288	4822 051 30472	4.7kΩ 5% 0.062W
3290	4822 051 30472	4.7kΩ 5% 0.062W
3291	4822 051 30472	4.7kΩ 5% 0.062W
3293	4822 051 30472	4.7kΩ 5% 0.062W
3294	4822 051 30101	100Ω 5% 0.062W
3295	4822 051 30101	100Ω 5% 0.062W
3296	4822 051 30101	100Ω 5% 0.062W
3297	4822 051 30101	100Ω 5% 0.062W
3298	4822 051 30101	100Ω 5% 0.062W
3299	4822 051 30101	100Ω 5% 0.062W
3307	4822 051 30103	10kΩ 5% 0.062W
3314	4822 051 30103	10kΩ 5% 0.062W
3315	4822 051 30101	100Ω 5% 0.062W
3316	4822 051 30101	100Ω 5% 0.062W
3317	4822 051 30101	100Ω 5% 0.062W
3318	4822 051 30101	100Ω 5% 0.062W
3319	4822 051 30101	100Ω 5% 0.062W
3320	4822 051 30339	33Ω 5% 0.062W
3321	4822 051 30339	33Ω 5% 0.062W
3322	4822 051 30339	33Ω 5% 0.062W
3323	4822 051 30339	33Ω 5% 0.062W
3324	4822 051 30339	33Ω 5% 0.062W
3325	4822 051 30339	33Ω 5% 0.062W
3326	4822 051 30339	33Ω 5% 0.062W
3327	4822 051 30339	33Ω 5% 0.062W
3328	4822 051 30339	33Ω 5% 0.062W
3329	4822 051 30339	33Ω 5% 0.062W
3330	4822 051 30339	33Ω 5% 0.062W
3331	4822 051 30339	33Ω 5% 0.062W
3332	4822 051 30339	33Ω 5% 0.062W
3333	4822 051 30339	33Ω 5% 0.062W
3334	4822 051 30339	33Ω 5% 0.062W
3335	4822 051 30339	33Ω 5% 0.062W
3336	4822 051 30339	33Ω 5% 0.062W
3338	4822 117 12139	22Ω 5% 0.062W
3339	4822 051 30472	4.7kΩ 5% 0.062W
3340	4822 051 30471	470Ω 5% 0.062W
3341	4822 051 30471	470Ω 5% 0.062W
3342	4822 117 12139	22Ω 5% 0.062W
3343	2322 702 60829	82Ω 5% 0603
3344	4822 051 30102	1kΩ 5% 0.062W
3345	4822 051 30472	4.7kΩ 5% 0.062W
3346	4822 051 30103	10kΩ 5% 0.062W
3347	2322 702 60829	82Ω 5% 0603
3348	4822 051 30103	10kΩ 5% 0.062W
3349	4822 051 30339	33Ω 5% 0.062W
3350	4822 051 30339	33Ω 5% 0.062W
3351	4822 051 30339	33Ω 5% 0.062W
3352	4822 051 30103	10kΩ 5% 0.062W
3353	4822 051 30472	4.7kΩ 5% 0.062W
3354	4822 051 30339	33Ω 5% 0.062W
3355	4822 051 30339	33Ω 5% 0.062W
3356	4822 051 30472	4.7kΩ 5% 0.062W
3359	4822 051 30103	10kΩ 5% 0.062W
3400	4822 051 30472	4.7kΩ 5% 0.062W
3401	4822 051 30472	4.7kΩ 5% 0.062W
3402	4822 051 30472	4.7kΩ 5% 0.062W
3403	4822 051 30472	4.7kΩ 5% 0.062W
3404	4822 051 30472	4.7kΩ 5% 0.062W
3405	4822 051 30332	3.3kΩ 5% 0.062W
3406	4822 051 30332	3.3kΩ 5% 0.062W
3407	4822 051 30332	3.3kΩ 5% 0.062W
3408	4822 051 30332	3.3kΩ 5% 0.062W
3409	4822 051 30472	4.7kΩ 5% 0.062W
3410	4822 051 30472	4.7kΩ 5% 0.062W
3411	4822 051 30472	4.7kΩ 5% 0.062W
3412	4822 051 30472	4.7kΩ 5% 0.062W
3413	4822 051 30472	4.7kΩ 5% 0.062W
3414	4822 051 30472	4.7kΩ 5% 0.062W
3415	4822 051 30472	4.7kΩ 5% 0.062W
3416	4822 051 30472	4.7kΩ 5% 0.062W
3417	4822 051 30472	4.7kΩ 5% 0.062W
3418	4822 051 30472	4.7kΩ 5% 0.062W
3419	4822 051 30472	4.7kΩ 5% 0.062W
3420	4822 051 30472	4.7kΩ 5% 0.062W
3421	4822 051 30472	4.7kΩ 5% 0.062W
3422	4822 051 30472	4.7kΩ 5% 0.062W
3423	4822 051 30472	4.7kΩ 5% 0.062W
3424	4822 051 30103	10kΩ 5% 0.062W
3425	4822 051 30103	10kΩ 5% 0.062W
3426	4822 051 30103	10kΩ 5% 0.062W
3427	4822 051 30103	10kΩ 5% 0.062W
3428	4822 051 30103	10kΩ 5% 0.062W
3429	4822 051 30339	33Ω 5% 0.062W
3430	4822 051 30339	33Ω 5% 0.062W
3431	4822 051 30339	33Ω 5% 0.062W
3432	4822 051 30339	33Ω 5% 0.062W
3433	5322 117 13036	1.2kΩ 1% 0.063W 0603
3434	4822 117 12971	15Ω 5% 0.62W 0603
3435	4822 117 12971	15Ω 5% 0.62W 0603
3436	4822 051 30339	33Ω 5% 0.062W
3437	4822 051 30339	33Ω 5% 0.062W
3438	4822 051 30339	33Ω 5% 0.062W
3439	4822 051 30339	33Ω 5% 0.062W
3440	4822 051 30339	33Ω 5% 0.062W
3442	4822 117 12139	22Ω 5% 0.062W
3443	4822 117 12139	22Ω 5% 0.062W
3444	4822 117 12139	22Ω 5% 0.062W
3445	4822 117 12139	22Ω 5% 0.062W
3446	4822 117 12139	22Ω 5% 0.062W
3447	4822 117 12139	22Ω 5% 0.062W
3448	4822 117 12139	22Ω 5% 0.062W
3449	4822 117 12139	22Ω 5% 0.062W
3450	4822 051 30109	10Ω 5% 0.062W
3451	4822 051 30109	10Ω 5% 0.062W
3453	4822 117 12139	22Ω 5% 0.062W
3454	4822 117 12139	22Ω 5% 0.062W
3455	4822 117 12139	22Ω 5% 0.062W
3456	4822 117 12139	22Ω 5% 0.062W
3457	4822 117 12139	22Ω 5% 0.062W
3458	4822 117 12139	22Ω 5% 0.062W
3459	4822 117 12139	22Ω 5% 0.062W
3460	4822 117 12139	22Ω 5% 0.062W
3461	4822 117 12139	22Ω 5% 0.062W
3462	4822 117 12139	22Ω 5% 0.062W
3463	4822 117 12139	22Ω 5% 0.062W
3464	4822 117 12139	22Ω 5% 0.062W
3465	4822 117 12139	22Ω 5% 0.062W
3466	4822 117 12139	22Ω 5% 0.062W
3467	4822 117 12139	22Ω 5% 0.062W
3468	4822 117 12139	22Ω 5% 0.062W
3469	4822 117 12139	22Ω 5% 0.062W
3470	4822 117 12139	22Ω 5% 0.062W
3471	4822 117 12139	22Ω 5% 0.062W
3472	4822 117 12139	22Ω 5% 0.062W
3473	4822 117 12139	22Ω 5% 0.062W
3474	4822 117 12139	22Ω 5% 0.062W
3475	4822 117 12139	22Ω 5% 0.062W
3476	4822 117 12139	22Ω 5% 0.062W
3477	4822 117 12139	22Ω 5% 0.062W
3478	4822 117 12139	22Ω 5% 0.062W
3479	4822 117 12139	22Ω 5% 0.062W
3480	4822 117 12139	22Ω 5% 0.062W
3481	4822 117 12139	22Ω 5% 0.062W
3482	4822 117 12139	22Ω 5% 0.062W
3483	4822 117 12139	22Ω 5% 0.062W
3484	4822 117 12139	22Ω 5% 0.062W
3485	4822 117 12139	22Ω 5% 0.062W
3486	4822 117 12139	22Ω 5% 0.062W
3487	4822 117 12139	22Ω 5% 0.062W
3488	4822 117 12139	22Ω 5% 0.062W
3489	4822 117 12139	22Ω 5% 0.062W
3490	4822 117 12139	22Ω 5% 0.062W
3491	4822 117 12139	22Ω 5% 0.062W
3492	4822 117 12139	22Ω 5% 0.062W
3493	4822 117 12139	22Ω 5% 0.062W
3494	4822 117 12139	22Ω 5% 0.062W
3495	4822 117 12139	22Ω 5% 0.062W
3496	4822 117 12139	22Ω 5% 0.062W
3497	4822 117 13632	100kΩ 1% 0603 0.62W
3498	4822 051 30103	10kΩ 5% 0.062W
3499	4822 051 30103	10kΩ 5% 0.062W
3503	5322 117 13034	1.5kΩ 1% 0.063W 0603
3504	2322 704 61302	1k3 1% 0.063W 0603
3703	5322 117 13055	75R 1% 0.063W 0603
3706	2322 704 61002	1kΩ 0603 RC22H PM1
3707	2322 704 61002	1kΩ 0603 RC22H PM1
3710	5322 117 13055	75R 1% 0.063W 0603
3714	2322 704 61002	1kΩ 0603 RC22H PM1
3716	2322 704 61002	1kΩ 0603 RC22H PM1
3718	5322 117 13055	75R 1% 0.063W 0603
3723	2322 704 61002	1kΩ 0603 RC22H PM1
3724	2322 704 61002	1kΩ 0603 RC22H PM1
3800	4822 051 30222	2.2kΩ 5% 0.062W
3801	4822 051 30103	10kΩ 5% 0.062W
3803	4822 051 30223	22kΩ 5% 0.062W
3805	4822 051 30101	100Ω 5% 0.062W
3806	4822 051 30101	100Ω 5% 0.062W
3807	4822 051 30101	100Ω 5% 0.062W
3808	4822 051 30472	4.7kΩ 5% 0.062W
3809	4822 051 30103	10kΩ 5% 0.062W
3810	4822 051 30103	10kΩ 5% 0.062W
3811	4822 051 30103	10kΩ 5% 0.062W
3812	4822 051 30103	10kΩ 5% 0.062W
3813	4822 051 30103	10kΩ 5% 0.062W
3814	4822 051 30103	10kΩ 5% 0.062W
3815	4822 051 30103	10kΩ 5% 0.062W
3817	4822 051 30472	4.7kΩ 5% 0.062W
3819	4822 051 30472	4.7kΩ 5% 0.062W
3820	4822 051 30472	4.7kΩ 5% 0.062W
3821	4822 051 30472	4.7kΩ 5% 0.062W
3822	4822 051 30472	4.7kΩ 5% 0.062W
3825	4822 051 30472	4.7kΩ 5% 0.062W
3826	4822 051 30472	4.7kΩ 5% 0.062W
3827	4822 051 30472	4.7kΩ 5% 0.062W
3831	4822 051 30472	4.7kΩ 5% 0.062W
3832	4822 051 30472	4.7kΩ 5% 0.062W

3836	4822 117 12139	22Ω 5% 0.062W
3837	4822 051 30103	10kΩ 5% 0.062W
3838	4822 051 30103	10kΩ 5% 0.062W
3839	4822 051 30103	10kΩ 5% 0.062W
3840	4822 117 12139	22Ω 5% 0.062W
3841	4822 051 30103	10kΩ 5% 0.062W
3842	4822 051 30103	10kΩ 5% 0.062W
3843	4822 051 30103	10kΩ 5% 0.062W
3844	4822 051 30103	10kΩ 5% 0.062W
3845	4822 051 30103	10kΩ 5% 0.062W
3846	4822 051 30103	10kΩ 5% 0.062W
3847	4822 051 30103	10kΩ 5% 0.062W
3848	4822 051 30103	10kΩ 5% 0.062W
3849	4822 051 30103	10kΩ 5% 0.062W
3850	4822 051 30103	10kΩ 5% 0.062W
3851	4822 051 30103	10kΩ 5% 0.062W
3852	4822 117 12139	22Ω 5% 0.062W
3853	4822 117 12139	22Ω 5% 0.062W
3854	4822 117 12139	22Ω 5% 0.062W
3855	4822 117 12139	22Ω 5% 0.062W
3856	4822 117 12139	22Ω 5% 0.062W
3857	4822 117 12139	22Ω 5% 0.062W
3858	4822 117 12139	22Ω 5% 0.062W
3859	4822 117 12139	22Ω 5% 0.062W
3860	4822 051 30339	33Ω 5% 0.062W
3861	4822 051 30102	1kΩ 5% 0.062W
3862	4822 051 30331	330Ω 5% 0.062W
3863	4822 051 30472	4.7kΩ 5% 0.062W
3901	2322 704 61801	180Ω 0603 RC22H PM1
3902	2322 704 65601	560Ω 1% 0603
3905	2322 704 61801	180Ω 0603 RC22H PM1
3906	2322 704 65601	560Ω 1% 0603
3907	4822 051 30101	100Ω 5% 0.062W
3908	4822 051 30181	180Ω 5% 0.062W
3909	4822 051 30689	68Ω 5% 0.063W 0603
3910	4822 051 30689	68Ω 5% 0.063W 0603
3911	4822 051 30561	560Ω 5% 0.062W
3912	4822 051 30222	2.2kΩ 5% 0.062W
3913	4822 117 12139	22Ω 5% 0.062W
3914	4822 051 30689	68Ω 5% 0.063W 0603
3915	4822 051 30472	4.7kΩ 5% 0.062W
3916	4822 051 30479	47Ω 5% 0.062W
3917	4822 051 30479	47Ω 5% 0.062W
3918	5322 117 13055	75R 1% 0.063W 0603
3919	4822 051 30102	1kΩ 5% 0.062W
3920	5322 117 13055	75R 1% 0.063W 0603
3921	4822 051 30102	1kΩ 5% 0.062W
3922	4822 051 30689	68Ω 5% 0.063W 0603
3923	4822 051 30223	22kΩ 5% 0.062W
3924	5322 117 13055	75R 1% 0.063W 0603
3925	4822 051 30103	10kΩ 5% 0.062W
3926	4822 051 30102	1kΩ 5% 0.062W
3927	5322 117 13055	75R 1% 0.063W 0603
3928	4822 051 30102	1kΩ 5% 0.062W
3929	2322 704 65609	56Ω 0603 RC22H 1%
3930	5322 117 13055	75R 1% 0.063W 0603
3931	4822 051 30102	1kΩ 5% 0.062W
3932	5322 117 13055	75R 1% 0.063W 0603
3933	4822 051 30102	1kΩ 5% 0.062W
3934	5322 117 13055	75R 1% 0.063W 0603
3935	5322 117 13055	75R 1% 0.063W 0603
3936	5322 117 13055	75R 1% 0.063W 0603
3937	5322 117 13055	75R 1% 0.063W 0603
3938	5322 117 13055	75R 1% 0.063W 0603
3939	5322 117 13055	75R 1% 0.063W 0603
3941	2322 704 87501	750Ω 603 RC22H 1%
3942	5322 117 13034	1.5kΩ 1% 0.063W 0603
3943	5322 117 13053	6.8kΩ 1% 0.063W 0603
3944	5322 117 13031	5.6kΩ 1% 0603
3945	5322 117 13026	4.7kΩ 1% 0.063W 0603
3946	2322 704 61002	1kΩ 0603 RC22H PM1
3947	5322 117 13026	4.7kΩ 1% 0.063W 0603
3948	2322 704 87501	750Ω 603 RC22H 1%
3949	5322 117 13034	1.5kΩ 1% 0.063W 0603
3950	5322 117 13034	1.5kΩ 1% 0.063W 0603
3951	5322 117 13034	1.5kΩ 1% 0.063W 0603
3952	5322 117 13036	1.2kΩ 1% 0.063W 0603
3953	5322 117 13026	4.7kΩ 1% 0.063W 0603
3954	2322 704 61002	1kΩ 0603 RC22H PM1
3955	4822 117 12917	1Ω 5% 0.062W 0603
3957	4822 051 30101	100Ω 5% 0.062W
3958	4822 051 30101	100Ω 5% 0.062W
3959	4822 051 30101	100Ω 5% 0.062W
3960	4822 051 30101	100Ω 5% 0.062W
3961	4822 051 30101	100Ω 5% 0.062W
3962	4822 051 30101	100Ω 5% 0.062W
4001	4822 051 30008	Jumper 0603
4004	4822 051 30008	Jumper 0603
4005	4822 051 30008	Jumper 0603
4111	4822 051 30008	Jumper 0603
4113	4822 051 30008	Jumper 0603
4115	4822 051 30008	Jumper 0603
4116	4822 051 30008	Jumper 0603
4117	4822 051 30008	Jumper 0603
4123	4822 051 30008	Jumper 0603
4201	4822 051 30008	Jumper 0603
4202	4822 051 30008	Jumper 0603
4204	4822 051 30008	Jumper 0603
4205	4822 051 30008	Jumper 0603
4302	4822 051 30008	Jumper 0603
4311	4822 051 30008	Jumper 0603
4316	4822 051 30008	Jumper 0603
4320	4822 051 30008	Jumper 0603
4322	4822 051 30008	Jumper 0603
4323	4822 051 30008	Jumper 0603
4401	4822 051 30008	Jumper 0603
4402	4822 051 30008	Jumper 0603
4404	4822 051 30008	Jumper 0603
4701	4822 051 30008	Jumper 0603
4702	4822 051 30008	Jumper 0603
4703	4822 051 30008	Jumper 0603
4762	4822 051 30008	Jumper 0603
4764	4822 051 30008	Jumper 0603
4766	4822 051 30008	Jumper 0603
4800	4822 051 30008	Jumper 0603
4801	4822 051 30008	Jumper 0603
4803	4822 051 30008	Jumper 0603
4808	4822 051 30008	Jumper 0603
4810	4822 051 30008	Jumper 0603
4811	4822 051 30008	Jumper 0603
4900	4822 051 30008	Jumper 0603
4901	4822 051 30008	Jumper 0603
4904	4822 051 30008	Jumper 0603
4905	4822 051 30008	Jumper 0603
4910	4822 051 30008	Jumper 0603

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5001	4822 157 11499	BLM11P600SPT
5005	4822 157 11499	BLM11P600SPT
5008	4822 157 11499	BLM11P600SPT
5009	4822 157 11499	BLM11P600SPT
5010	4822 157 11499	BLM11P600SPT
5012	4822 051 30101	100Ω 5% 0.062W
5100	4822 157 11499	BLM11P600SPT
5102	4822 157 11499	BLM11P600SPT
5103	4822 157 11499	BLM11P600SPT
5104	4822 157 11499	BLM11P600SPT
5200	4822 157 11499	BLM11P600SPT
5202	4822 157 11499	BLM11P600SPT
5203	4822 157 11499	BLM11P600SPT
5204	4822 157 11499	BLM11P600SPT
5302	4822 157 11499	BLM11P600SPT
5320	4822 157 11499	BLM11P600SPT
5321	4822 157 11499	BLM11P600SPT
5322	4822 157 11499	BLM11P600SPT
5323	4822 157 11499	BLM11P600SPT
5400	4822 157 11499	BLM11P600SPT
5401	4822 157 11717	BLM31P500SPT
5402	4822 157 11717	BLM31P500SPT
5403	4822 157 11499	BLM11P600SPT
5404	4822 157 11499	BLM11P600SPT
5405	4822 157 11717	BLM31P500SPT
5406	4822 157 11717	BLM31P500SPT
5501	4822 157 11717	BLM31P500SPT
5502	4822 157 11499	BLM11P600SPT
5503	2422 535 94995	10µH 1014520%
5711	4822 157 70649	4,7µH (NL322522T-4R7J)
5712	4822 157 70649	4,7µH (NL322522T-4R7J)
5802	4822 157 11499	BLM11P600SPT
5803	4822 157 11499	BLM11P600SPT
5804	4822 157 11499	BLM11P600SPT
5808	4822 157 11499	BLM11P600SPT
5809	4822 157 11499	BLM11P600SPT
5901	4822 157 11499	BLM11P600SPT
5902	4822 157 70649	4,7µH (NL322522T-4R7J)
5903	4822 157 70649	4,7µH (NL322522T-4R7J)
5904	3198 018 90050	Bead 1kΩ at 100MHz
5905	2422 549 45634	0603 EMI 100MHZ 60R
5906	2422 549 45634	0603 EMI 100MHZ 60R
5907	2422 536 00609	LBC2518 1U5 PM20
5908	2422 536 00609	LBC2518 1U5 PM20
5909	2422 549 45634	0603 EMI 100MHZ 60R
5910	2422 536 00609	LBC2518 1U5 PM20
5911	2422 536 00609	LBC2518 1U5 PM20
5912	2422 536 00609	LBC2518 1U5 PM20
5913	2422 536 00609	LBC2518 1U5 PM20
5914	2422 549 45634	0603 EMI 100MHZ 60R
5915	2422 549 45634	0603 EMI 100MHZ 60R
5916	4822 157 11499	BLM11P600SPT

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6000	4822 130 11528	1PS76SB10
6100	4822 130 11528	1PS76SB10
6101	4822 130 11528	1PS76SB10

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7002	9352 683 81115	74LVC1G32GW
7003	5322 130 60159	BC846B
7004	9352 673 95518	SAA7118E/V1
7006	9322 116 74668	LD1117D33
7103	9352 683 81115	74LVC1G32GW
7104	9352 500 20118	74LVC08AD
7106	9322 191 99685	NCP303LSN29
7107	9352 500 20118	74LVC08AD
7111	5322 209 71568	PC74HCT14T
7300	9352 317 00118	74LVC125AD
7320	9352 115 40118	74LVC245APW
7321	9352 115 40118	74LVC245APW
7322	9352 115 40118	74LVC245APW
7400	9352 725 55557	PNX7100EH/C1
7401	9352 115 40118	74LVC245APW
7402	2722 171 08819	4MHZ 15P FXO34FL
7403	3198 010 42310	BC847BW
7500	9322 188 69668	STS5DNF20V
7501	9322 188 68668	NCP1570D
7701	9322 200 00685	AD8091ART
7702	9322 205 55668	AD8092AR
7803	9352 499 60118	74LVC00AD
7805	9322 188 64668	AM29DL640G-70EI
7807	3104 123 97321	AM29DL640G-70EI P1_7_A_280.BIN
7809	9322 130 41668	M24C64-WMN6
7810	9965 000 18099	M24C64-WMN6/CHR BOOT1.0
7812	9322 187 09668	MT48LC16M16A2TG-7E
7813	9322 187 09668	MT48LC16M16A2TG-7E
7900	9352 684 56115	74LVC1G04GW
7901	9352 684 56115	74LVC1G04GW
7902	4822 130 61553	DTC124EU
7903	9352 456 80115	74HCT1G125GW
7904	5322 130 60159	BC846B
7905	4822 130 61553	DTC124EU
7906	5322 130 60159	BC846B
7907	5322 130 60159	BC846B
7908	5322 130 60159	BC846B
7909	5322 130 60159	BC846B
7910	9322 205 55668	AD8092AR
7911	5322 130 60159	BC846B
7912	5322 130 60159	BC846B

EPG Board

Various

Y4	9965 000 20142	20.25 MHZ,+-30PPM, 20PF,FUNDAM,
Y5	9965 000 20143	17.734475 MHZ,5V, +- 50PPM, CMOS
Y6	9965 000 20144	36 MHZ,3V,+- 50PPM,CMOS/TTL,SMD

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C1		0.01uF,+- 20%,0603,Y5V,50V
C2		0.1uF,+80- 20%,0603,Y5V,25V
C3		0.1uF,+80- 20%,0603,Y5V,25V
C4		0.1uF,+80- 20%,0603,Y5V,25V
C5		1000pF,+- 10%,0603,X7R,50V
C6		0.22uF,+80- 20%,0603,Y5V,16V
C7		100pF,+-5%,0603,NPO,50V
C8		100pF,+-5%,0603,NPO,50V
C9		100pF,+-5%,0603,NPO,50V
C10		100pF,+-5%,0603,NPO,50V
C11		0.1uF,+80- 20%,0603,Y5V,25V
C12		0.1uF,+80- 20%,0603,Y5V,25V
C13		0.1uF,+80- 20%,0603,Y5V,25V
C14		0.1uF,+80- 20%,0603,Y5V,25V
C15		0.1uF,+80- 20%,0603,Y5V,25V
C16		0.1uF,+80- 20%,0603,Y5V,25V
C17		0.1uF,+80- 20%,0603,Y5V,25V

C18		0.1uF,+80-20%,0603,Y5V,25V
C19		0.1uF,+80-20%,0603,Y5V,25V
C20		0.1uF,+80-20%,0603,Y5V,25V
C21		0.1uF,+80-20%,0603,Y5V,25V
C22		0.1uF,+80-20%,0603,Y5V,25V
C23		0.1uF,+80-20%,0603,Y5V,25V
C24		0.1uF,+80-20%,0603,Y5V,25V
C25		0.1uF,+80-20%,0603,Y5V,25V
C26		0.1uF,+80-20%,0603,Y5V,25V
C27		0.1uF,+80-20%,0603,Y5V,25V
C28		0.1uF,+80-20%,0603,Y5V,25V
C29		0.1uF,+80-20%,0603,Y5V,25V
C30		0.1uF,+80-20%,0603,Y5V,25V
C31		0.1uF,+80-20%,0603,Y5V,25V
C32		0.1uF,+80-20%,0603,Y5V,25V
C33		0.1uF,+80-20%,0603,Y5V,25V
C34		0.1uF,+80-20%,0603,Y5V,25V
C35		0.1uF,+80-20%,0603,Y5V,25V
C36		100pF,+-5%,0603,NPO,50V
C39		0.1uF,+80-20%,0603,Y5V,25V
C40		0.1uF,+80-20%,0603,Y5V,25V
C41		0.1uF,+80-20%,0603,Y5V,25V
C42		0.1uF,+80-20%,0603,Y5V,25V
C43		0.1uF,+80-20%,0603,Y5V,25V
C44		0.1uF,+80-20%,0603,Y5V,25V
C45		0.1uF,+80-20%,0603,Y5V,25V
C46		0.1uF,+80-20%,0603,Y5V,25V
C47		0.1uF,+80-20%,0603,Y5V,25V
C48		0.1uF,+80-20%,0603,Y5V,25V
C49		0.1uF,+80-20%,0603,Y5V,25V
C50		0.1uF,+80-20%,0603,Y5V,25V
C51		0.1uF,+80-20%,0603,Y5V,25V
C53		0.1uF,+80-20%,0603,Y5V,25V
C54		100pF,+-5%,0603,NPO,50V
C55		100pF,+-5%,0603,NPO,50V
C56		0.22uF,+80-20%,0603,Y5V,16V
C57		0.1uF,+80-20%,0603,Y5V,25V
C58		0.1uF,+80-20%,0603,Y5V,25V
C59		0.1uF,+80-20%,0603,Y5V,25V
C60		0.1uF,+80-20%,0603,Y5V,25V
C61		0.1uF,+80-20%,0603,Y5V,25V
C62		0.1uF,+80-20%,0603,Y5V,25V
C63		0.1uF,+80-20%,0603,Y5V,25V
C64		0.1uF,+80-20%,0603,Y5V,25V
C66	4822 124 11606	10UF 20% 16V
C67		0.1uF,+80-20%,0603,Y5V,25V
C68		470pF,+-10%,0603,X7R,50V
C71	4822 124 11606	10UF 20% 16V
C72	4822 124 11606	10UF 20% 16V
C75	4822 124 11606	10UF 20% 16V
C76		0.22uF,+80-20%,0603,Y5V,16V
C77		100pF,+-5%,0603,NPO,50V
C79		0.01uF,+-20%,0603,Y5V,50V
C80		0.01uF,+-20%,0603,Y5V,50V
C81		0.01uF,+-20%,0603,Y5V,50V
C82		0.01uF,+-20%,0603,Y5V,50V
C84		0.01uF,+-20%,0603,Y5V,50V
C89		0.01uF,+-20%,0603,Y5V,50V
C91	4822 124 11606	10UF 20% 16V
C92		0.01uF,+-20%,0603,Y5V,50V
C93	4822 124 11606	10UF 20% 16V
C94		0.01uF,+-20%,0603,Y5V,50V
C95	4822 124 11606	10UF 20% 16V
C96	4822 124 11606	10UF 20% 16V
C97		0.01uF,+-20%,0603,Y5V,50V
C98		0.01uF,+-20%,0603,Y5V,50V
C99		0.01uF,+-20%,0603,Y5V,50V
C100		0.01uF,+-20%,0603,,50V
C101		27pF,+-5%, 0603,NPO,50V
C102		27pF,+-5%, 0603,NPO,50V
C104		1uF,16V,20%,0603,Y5V,16V
C105	4822 124 11606	10µF 20% 16V
C106		100pF,+-5%,0603,,50V
C107	4822 124 11606	10µF 20% 16V
C109	4822 124 11606	10µF 20% 16V
C116		0.022uF,+-10%,0603,,25V
C117	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C118		0.022uF,+-10%,0603,,25V
C119	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C121	4822 124 11606	10µF 20% 16V
C126		18pF,+-10%,0603,,50V
C143	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C153	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C158	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C159	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C161	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C163	9965 000 20147	E 220µF ,16V,+-20%,M6X8,LESR
C166	9965 000 20148	E 47µF ,16V,+-20%,6.3X5.3,LESR
C165		680pF,+-10%,0603,X7R,50V
C166		E 47uF,16V,+-20%,6.3x5.3,LESR
C167	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C171	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C173	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C178		1uF,16V,20%,0603,Y5V,16V
C179		1uF,16V,20%,0603,Y5V,16V
C180		1uF,16V,20%,0603,Y5V,16V
C181		1uF,16V,20%,0603,Y5V,16V
C182		1uF,16V,20%,0603,Y5V,16V
C183		1uF,16V,20%,0603,Y5V,16V
C188		1uF,16V,20%,0603,Y5V,16V
C189		1uF,16V,20%,0603,Y5V,16V
C190	4822 124 11606	10µF 20% 16V
C191	4822 124 11606	10µF 20% 16V
C192	4822 124 11606	10µF 20% 16V
C193	4822 124 11606	10µF 20% 16V
C200		1uF,16V,20%,0603,Y5V,16V
C201		1uF,16V,20%,0603,Y5V,16V
C202		1uF,16V,20%,0603,Y5V,16V
C203		1uF,16V,20%,0603,Y5V,16V
C301	9965 000 20148	E 47µF ,16V,+-20%,6.3X5.3,LESR
C302	9965 000 20147	E 220µF ,16V,+-20%,M6X8,LESR
C304	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C306	9965 000 20146	TAnF 47µF ,B SIZE,6.3V
C400		1uF,16V,20%,0603,Y5V,16V
C401	4822 124 11606	10µF 20% 16V
C402	4822 124 11606	10µF 20% 16V
C410	4822 124 11606	10µF 20% 16V
C411	4822 124 11606	10µF 20% 16V
C413		1uF,16V,20%,0603,Y5V,16V
C430		680pF,+-5%,0603,NPO,50V
C431		1nF,+-10%,0603,X7R,50V

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R1		100K Ohm,+-5%,0603,1/10W
R2		10K Ohm,+-5%,0603,1/10W
R3		100K Ohm,+-5%,0603,1/10W
R4		1K Ohm,+-5%. 0603,1/10W
R5		47 Ohm,+-5%,0603,1/10W
R6		1K Ohm,+-5%. 0603,1/10W
R7		100 Ohm,+-5%,0603,1/10W
R8		10K Ohm,+-5%,0603,1/10W
R9		1K Ohm,+-5%. 0603,1/10W
R10		100 Ohm,+-5%,0603,1/10W
R11		10K Ohm,+-5%,0603,1/10W
R12		100 Ohm,+-5%,0603,1/10W
R13		Array x 4,47Ohm,8P4R,+-5%,1/16
R14		100K Ohm,+-5%,0603,1/10W
R15		Array x 4,47Ohm,8P4R,+-5%,1/16
R16		1K Ohm,+-5%. 0603,1/10W
R17		1K Ohm,+-5%. 0603,1/10W
R18		1K Ohm,+-5%. 0603,1/10W
R19		Array x 4,47Ohm,8P4R,+-5%,1/16
R20		Array x 4,47Ohm,8P4R,+-5%,1/16
R21		Array x 4,47Ohm,8P4R,+-5%,1/16
R22		Array x 4,47Ohm,8P4R,+-5%,1/16
R23		Array x 4,47Ohm,8P4R,+-5%,1/16
R24		Array x 4,47Ohm,8P4R,+-5%,1/16
R25		47 Ohm,+-5%,0603,1/10W
R26		47 Ohm,+-5%,0603,1/10W
R27		47 Ohm,+-5%,0603,1/10W
R28		Array x 4,47Ohm,8P4R,+-5%,1/16
R29		100K Ohm,+-5%,0603,1/10W
R30		10K Ohm,+-5%,0603,1/10W
R31		10K Ohm,+-5%,0603,1/10W
R32		2.2K Ohm,+-5%,0603,1/10W
R33		47 Ohm,+-5%,0603,1/10W
R34		0 Ohm,+-5%,0603,1/10W
R35		2.2K Ohm,+-1%,0603,1/10W
R36		4.7K Ohm,+-5%,0603,1/10W
R37		4.7K Ohm,+-5%,0603,1/10W
R38		2.2K Ohm,+-5%,0603,1/10W
R39		5.6K Ohm,+-1%,0603,1/10W
R40		10K Ohm,+-5%,0603,1/10W
R41		4.7K Ohm,+-5%,0603,1/10W
R42		150 Ohm,+-5%,0603,1/10W
R43		1K Ohm,+-5%. 0603,1/10W
R44		1K Ohm,+-5%. 0603,1/10W
R45		1M Ohm,+-5%,0603,1/10W
R46		4.7K Ohm,+-5%,0603,1/10W
R47		10K Ohm,+-5%,0603,1/10W
R48		Array x 4,47Ohm,8P4R,+-5%,1/16
R49		Array x 4,47Ohm,8P4R,+-5%,1/16
R50		Array x 4,47Ohm,8P4R,+-5%,1/16
R51		Array x 4,47Ohm,8P4R,+-5%,1/16
R52		1M Ohm,+-5%,0603,1/10W
R53		10K Ohm,+-5%,0603,1/10W
R54		1M Ohm,+-5%,0603,1/10W
R55		0 Ohm,+-5%,0603,1/10W
R56		470 Ohm,+-5%,0603,1/10W
R57		10K Ohm,+-5%,0603,1/10W
R58		680K Ohm,+-1%. 0603,1/10W
R59		680K Ohm,+-1%. 0603,1/10W
R61		0 Ohm,+-5%,0603,1/10W
R62		10K Ohm,+-5%,0603,1/10W
R63		10K Ohm,+-5%,0603,1/10W
R64		100 Ohm,+-5%,0603,1/10W
R65		100 Ohm,+-5%,0603,1/10W

R66	100 Ohm,+-5%,0603,1/10W
R67	100 Ohm,+-5%,0603,1/10W
R68	10K Ohm,+-5%,0603,1/10W
R69	10K Ohm,+-5%,0603,1/10W
R70	10K Ohm,+-5%,0603,1/10W
R71	1.5K Ohm,+-5%,0603,1/10W
R72	470 Ohm,+-5%,0603,1/10W
R73	10K Ohm,+-5%,0603,1/10W
R74	0 Ohm,+-5%,0603,1/10W
R75	1.5K Ohm,+-5%,0603,1/10W
R76	22K Ohm,+-5%,0603,1/10W
R77	2.7K Ohm,+-5%,0603,1/10W
R78	1K Ohm,+-5%. 0603,1/10W
R79	3.3K Ohm,+-5%,0603,1/10W
R80	3.3K Ohm,+-1%,0603,1/10W
R81	100K Ohm,+-5%,0603,1/10W
R82	100 Ohm,+-5%,0603,1/10W
R83	2.7K Ohm,+-5%,0603,1/10W
R84	470 Ohm,+-5%,0603,1/10W
R85	1K Ohm,+-5%. 0603,1/10W
R86	820 Ohm,+-1%,0603,1/10W
R87	1.2K Ohm,+-5%,0603,1/10W
R88	100 Ohm,+-5%,0603,1/10W
R89	100 Ohm,+-5%,0603,1/10W
R90	100 Ohm,+-5%,0603,1/10W
R91	240 Ohm,+-5%,0603,1/10W
R92	240 Ohm,+-5%,0603,1/10W
R93	240 Ohm,+-5%,0603,1/10W
R94	100 Ohm,+-5%,0603,1/10W
R95	100 Ohm,+-5%,0603,1/10W
R96	100 Ohm,+-5%,0603,1/10W
R97	100 Ohm,+-5%,0603,1/10W
R98	100 Ohm,+-5%,0603,1/10W
R99	100 Ohm,+-5%,0603,1/10W
R100	0 Ohm,+-5%,0603,1/10W
R101	47k Ohm,+-1%,0603,1/10W
R102	47k Ohm,+-1%,0603,1/10W
R103	100k Ohm,+-5%,0603,1/10W
R104	5.1k Ohm,+-1%,0603,1/10W
R105	47k Ohm,+-1%,0603,1/10W
R106	47k Ohm,+-1%,0603,1/10W
R107	10k Ohm,+-5%,0603,1/10W
R108	430 Ohm,+-1%,0603,1/10W
R109	100 Ohm,+-5%,0603,1/10W
R110	100k Ohm,+-5%,0603,1/10W
R111	100 Ohm,+-5%,0603,1/10W
R112	10k Ohm,+-5%,0603,1/10W
R113	1k Ohm,+-5%. 0603,1/10W
R114	1k Ohm,+-5%. 0603,1/10W
R115	1k Ohm,+-5%. 0603,1/10W
R116	1k Ohm,+-5%. 0603,1/10W
R117	1M Ohm,+-5%,0603,1/10W
R118	1k Ohm,+-5%. 0603,1/10W
R119	1k Ohm,+-5%. 0603,1/10W
R120	1M Ohm,+-5%,0603,1/10W
R121	1M Ohm,+-5%,0603,1/10W
R122	100 Ohm,+-5%,0603,1/10W
R123	1M Ohm,+-5%,0603,1/10W
R124	10k Ohm,+-5%,0603,1/10W
R125	100k Ohm,+-5%,0603,1/10W
R126	1k Ohm,+-1%,0603,1/10W
R127	10k Ohm,+-5%,0603,1/10W
R128	1k Ohm,+-5%. 0603,1/10W
R129	10k Ohm,+-5%,0603,1/10W
R130	10k Ohm,+-5%,0603,1/10W
R131	1k Ohm,+-5%. 0603,1/10W
R132	1k Ohm,+-5%. 0603,1/10W
R133	10k Ohm,+-5%,0603,1/10W
R134	1k Ohm,+-1%,0603,1/10W
R135	1M Ohm,+-5%,0603,1/10W
R136	1M Ohm,+-5%,0603,1/10W
R137	1k Ohm,+-5%. 0603,1/10W
R138	10k Ohm,+-5%,0603,1/10W
R139	10k Ohm,+-5%,0603,1/10W
R140	1k Ohm,+-5%. 0603,1/10W
R141	1k Ohm,+-5%. 0603,1/10W
R142	100 Ohm,+-5%,0603,1/10W
R143	1k Ohm,+-1%,0603,1/10W
R144	10k Ohm,+-5%,0603,1/10W
R145	10k Ohm,+-5%,0603,1/10W
R146	1k Ohm,+-5%. 0603,1/10W
R147	10k Ohm,+-5%,0603,1/10W
R148	10k Ohm,+-5%,0603,1/10W
R149	1k Ohm,+-5%. 0603,1/10W
R150	1k Ohm,+-5%. 0603,1/10W
R151	10k Ohm,+-5%,0603,1/10W
R152	0.22 Ohm,+-5%,1206,1/8W or 1/4
R153	0.22 Ohm,+-5%,1206,1/8W or 1/4
R154	1M Ohm,+-5%,0603,1/10W
R155	5.1k Ohm,+-5%,0603,1/10W
R156	10k Ohm,+-5%,0603,1/10W
R157	10k Ohm,+-5%,0603,1/10W
R158	1.5k Ohm,+-5%,0603,1/10W
R159	10k Ohm,+-5%,0603,1/10W
R160	1k Ohm,+-1%,0603,1/10W
R161	1k Ohm,+-1%,0603,1/10W
R162	5.6k Ohm,+-5%,0603,1/10W
R163	2.7k Ohm,+-5%,0603,1/10W
R164	1k Ohm,+-1%,0603,1/10W
R165	1k Ohm,+-5%. 0603,1/10W
R166	1k Ohm,+-5%. 0603,1/10W
R167	1k Ohm,+-5%. 0603,1/10W
R168	68Ohm,+-5%. 0603,1/10W
R169	68Ohm,+-5%. 0603,1/10W
R170	68Ohm,+-5%. 0603,1/10W
R171	10k Ohm,+-5%,0603,1/10W
R176	4.7k Ohm,+-5%,0603,1/10W
R177	4.7k Ohm,+-5%,0603,1/10W
R178	1M Ohm,+-5%,0603,1/10W
R179	0 Ohm,+-5%,0603,1/10W
R181	1M Ohm,+-5%,0603,1/10W
R182	10k Ohm,+-5%,0603,1/10W
R183	100 Ohm,+-5%,0603,1/10W
R184	10k Ohm,+-5%,0603,1/10W
R185	5.1k Ohm,+-5%,0603,1/10W
R186	5.6k Ohm,+-5%,0603,1/10W
R187	10k Ohm,+-5%,0603,1/10W
R188	1k Ohm,+-5%. 0603,1/10W
R189	0 Ohm,+-5%,0603,1/10W

L1	9965 000 23886	0.7A SMT43-220K
L11	9965 000 20149	POWER 100UH,1A,SMT105-101K
L12	9965 000 23886	0.7A SMT43-220K
L13	9965 000 23886	0.7A SMT43-220K
L14	9965 000 23682	CHIP INDUCTOR 12UH SIZE 1210 M
L15	9965 000 23682	CHIP INDUCTOR 12UH SIZE 1210 M
L3	9965 000 23682	CHIP INDUCTOR 12UH SIZE 1210 M
L4	9965 000 23682	CHIP INDUCTOR 12UH SIZE 1210 M
L5	9965 000 23682	CHIP INDUCTOR 12UH SIZE 1210 M
L6	9965 000 23682	CHIP INDUCTOR 12UH SIZE 1210 M
L7	9965 000 23682	CHIP INDUCTOR 12UH SIZE 1210 M
L8	9965 000 23683	CHIP INDUCTOR 68UH SIZE 1812 W
L9	9965 000 20149	POWER 100UH,1A,SMT105-101K

D1	9965 000 20150	1N4148WS SOD-323
D2	9965 000 20150	1N4148WS SOD-323
D3	9965 000 20150	1N4148WS SOD-323
D4	9965 000 20150	1N4148WS SOD-323
D5	9965 000 20151	SCHOTTKY B240A SMA
D6	9965 000 20151	SCHOTTKY B240A SMA

Q1	9965 000 20152	MMBT3904LT1 SMD SOT23
Q2	9965 000 20152	MMBT3904LT1 SMD SOT23
Q3	9965 000 20152	MMBT3904LT1 SMD SOT23
Q4	9965 000 20152	MMBT3904LT1 SMD SOT23
Q5	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q6	9965 000 20152	MMBT3904LT1 SMD SOT23
Q7	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q8	9965 000 20152	MMBT3904LT1 SMD SOT23
Q9	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q10	9965 000 20152	MMBT3904LT1 SMD SOT23
Q13	9965 000 20152	MMBT3904LT1 SMD SOT23
Q18	9965 000 20152	MMBT3904LT1 SMD SOT23
Q19	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q20	9965 000 20152	MMBT3904LT1 SMD SOT23
Q21	9965 000 20152	MMBT3904LT1 SMD SOT23
Q22	9965 000 20152	MMBT3904LT1 SMD SOT23
Q23	9965 000 20152	MMBT3904LT1 SMD SOT23
Q24	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q25	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q26	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q27	9965 000 20152	MMBT3904LT1 SMD SOT23
Q28	9965 000 20152	MMBT3904LT1 SMD SOT23
Q29	9965 000 20152	MMBT3904LT1 SMD SOT23
Q30	9965 000 20152	MMBT3904LT1 SMD SOT23
Q31	9965 000 20152	MMBT3904LT1 SMD SOT23
Q32	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q33	9965 000 20152	MMBT3904LT1 SMD SOT23
Q34	9965 000 20152	MMBT3904LT1 SMD SOT23
Q35	9965 000 20152	MMBT3904LT1 SMD SOT23
Q36	9965 000 20152	MMBT3904LT1 SMD SOT23
Q37	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q38	9965 000 20152	MMBT3904LT1 SMD SOT23
Q39	9965 000 20152	MMBT3904LT1 SMD SOT23
Q40	9965 000 20152	MMBT3904LT1 SMD SOT23
Q41	9965 000 20152	MMBT3904LT1 SMD SOT23
Q42	9965 000 12392	TR PNP MMBT3906LT1 SOT23
Q43	9965 000 20153	MOSFET XP162A12A6PR, P-CHANNEL
Q44	9965 000 20152	MMBT3904LT1 SMD SOT23
Q45	9965 000 20152	MMBT3904LT1 SMD SOT23
Q46	9965 000 20152	MMBT3904LT1 SMD SOT23
Q47	5322 130 60159	BC846B
Q48	9965 000 20152	MMBT3904LT1 SMD SOT23
U1	9965 000 20154	MCU SAMSUNG S3C3410X
U2	9965 000 20155	GEMSTAR ASIC GSA03 UPD82553GD-
U3	9965 000 13563	HY57V161610D TC-8 SDRAM(16M)
U4	9965 000 20156	74LV32D TSSOP
U5	9965 000 20157	EEPROM AT24C16,S08 AT24C16N-10
U6	9965 000 20158	74LV174D TSSOP
U7	9965 000 13563	HY57V161610D TC-8 SDRAM(16M)
U8	9965 000 20159	HY29LV160BT-90V
U9	9965 000 20159	HY29LV160BT-90V
U10	9965 000 20160	SYNC SEPARATOR GS4981-CKA SO8
U11	9965 000 20161	PIP CONTROLLER SDA9488X-B31
U13	9322 131 22668	IC SM TSH95D R
U14	9322 053 99668	IC SM AD725AR (ANA0) R
U15	9322 179 71668	IC SM NJM2285M (JRC0) R
U16	9965 000 20162	MC74VHC1G66DFT2 SOT353
U17	9322 187 83668	IC SM NJM2584M (JRC0) R
U18	9965 000 20162	MC74VHC1G66DFT2 SOT353
U19	9965 000 20162	MC74VHC1G66DFT2 SOT353
U20	2422 025 17367	CON BM V7P F1.00FFC 0.03B
U21	4822 265 11154	52030-2210 (22P)
U22	2422 025 17367	CON BM V7P F1.00FFC 0.03B
U23	2422 025 16727	CON V 4P F 1.00 FFC 0.3 B
U24	4822 265 11154	52030-2210 (22P)
U25	4822 267 11031	10P. FEM. V
U26	4822 267 11031	10P. FEM. V
U27	9965 000 20163	LOW DROP OUT REGULATOR KF50BDT
U28	9965 000 20164	MC34063ADR2 SMD
U29	9965 000 20165	KF33BDT-DPAK 3.3V
U30	9965 000 20165	KF33BDT-DPAK 3.3V
U31	4822 209 17345	M62320FP
U33	9965 000 20166	NLAST4599DFT2 TSOP
U40	9965 000 20164	MC34063ADR2 SMD
U42	9322 187 83668	IC SM NJM2584M (JRC0) R
U50	9322 174 75668	IC SM NJM2235M (JRC0) R

11. Revision List

11.1 3122 785 14281

- Aug 30th 2004.

Added DVDR725H